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Environmental Audit
of the Environmental Measurements Laboratory (EML)

U.S. Department of Energy
Office of Environmental Audit
Washington, DC 20585

February 1992

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PREFACE

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U.S. Department of Energy
Environmental Audit
Conducted at the
Environmental Measurements Laboratory (EML)

On June 27, 1989, the Secretary of Energy announced a 10-point Initiative to strengthen environmental protection within the U.S. Department of Energy (DOE). Consistent with this Initiative, the Secretary emphasized and strengthened independent internal oversight as a management reform in Secretary of Energy Notice (SEN)-11-89, which would monitor the effectiveness of DOE management in complying with operational, environmental, safety, health, and security standards established by law, regulation, and DOE policy.

As part of the internal oversight responsibilities within DOE, the Office of Environment, Safety and Health (EH) has established a program within the Office of Environmental Audit (EH-24) to conduct multidisciplinary environmental audits at DOE's operating facilities. The initial audits in this program are designed to gather baseline information on environmental compliance and management at facilities that have not undergone a DOE Headquarters Environmental Survey or Tiger Team Assessment, and are not expected to be scheduled for a Tiger Team Assessment through Fiscal Year 1992.

The objective of the Environmental Audit is to provide the Secretary with information on the compliance status of DOE facilities with regard to environmental requirements, root causes for noncompliance, adequacy of DOE environmental management programs, and response actions to address the identified problem areas.

This document contains the findings identified during the Environmental Audit of the Environmental Measurements Laboratory (EML), conducted from December 2 to 13, 1991. The Audit included the EML facility located in a fifth-floor General Services Administration (GSA) office building located in New York City, and a remote environmental monitoring station located in Chester, New Jersey.

The scope of this Environmental Audit was comprehensive, covering all areas of environmental activities and waste management operations, with the exception of the National Environmental Policy Act (NEPA), which is the responsibility of the DOE Headquarters Office of NEPA Oversight. Compliance with applicable Federal, state, and local regulations; applicable DOE Orders; and internal facility requirements was addressed.

December 1991
Washington, D.C.

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Environmental Measurements Laboratory (EML)

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

This report documents the results of the U.S. Department of Energy's (DOE's) Environmental Audit, conducted by the DOE Headquarters (DOE-HQ) Office of Environmental Audit, of the Environmental Measurements Laboratory (EML). The EML facilities included in the Audit are the fifth-floor (approximately 75,000 square feet) of a 12-story Government Services Administration (GSA)-owned building located in New York City and a rural field site located in Chester, New Jersey, which serves as a regional baseline monitoring station. The independent Audit was conducted by a team of professionals, including DOE and contractor personnel. The purpose of the Audit is to provide the Secretary of Energy, Admiral James D. Watkins, USN (Retired), with the status of environmental programs within EML.

EML is a government-owned, government-operated laboratory within the Office of Energy Research's (ER's) Office of Health and Environmental Research (OHER) and is administered by the DOE Field Office, Chicago (DOE-CH). EML's primary mission is to conduct environmental research concerning pollutants associated with energy technologies and related national security activities, principally for the purpose of providing scientific information required to determine the consequent effect on human health and the environment.

The scope of the EML Environmental Baseline Audit was comprehensive, covering all environmental media; Federal, state, and local regulations, requirements, and best management practices; and DOE and DOE-CH Orders, with the exception of the National Environmental Policy Act (NEPA). The technical disciplines addressed by the Audit were: Air, Surface Water/Drinking Water, Waste Management, Toxic and Chemical Materials, Quality Assurance, Radiation, Inactive Waste Sites, and Environmental Management. Due to EML's location, and the activities conducted at the Chester Field site, no issues were identified in the technical disciplines of Groundwater and Soils, Sediments, and Biota.

Onsite activities at EML took place from December 2 to 13, 1991, and included document reviews; contact with Federal, state, and local agencies; reviews of internal or DOE-CH assessments or appraisals; interviews with EML, DOE-CH, and OHER personnel; and daily team debriefings. Using these sources of information, the team developed findings which fall into two categories: compliance and best management practice. Each finding also contains the apparent causal factors to assist EML in developing "root causes" for implementing corrective action.

EML has defined its environmental risks as low and, therefore, has not been proactive in its environmental compliance activities. Consequently, environmental protection has historically been a low priority, resulting in the present informal and incomplete environmental protection program to demonstrate compliance with Federal, state, and local regulations; DOE Orders; and best management practices.

The Environmental Audit Team identified 10 compliance findings associated with regulations and DOE Orders, and 11 best management practice findings dealing with nonconformance to environmental best management practices. All findings require corrective action, but none were found to reflect situations that present an immediate risk to public health or the environment. The key findings, which cross environmental disciplines, are as follows:

> Determination of Environmental Statutes, Regulations, and DOE Orders. EML has not determined the "operating envelope" of environmental regulations and DOE requirements associated with all facets of its operations.
>
> Informality of Environmental Protection Program. An overall tendency toward informality of operations, which is seen at all levels of the organization and is reflected in a lack of formal procedures and policy implementation guidance.
>
> Self-Assessment Program. EML is in the beginning stage of development of a Self-Assessment Program.

The causal factors which appear most often in the judgment of the Audit Team were policy implementation, procedures, and training. In addition, the tasks required to institute a comprehensive Environmental Protection Program have the potential to overwhelm existing resources.

SECTION 1.0

INTRODUCTION

1.0 INTRODUCTION

The Environmental Audit covered in this report is a comprehensive, baseline Audit of the Environmental Measurements Laboratory (EML), located in New York City, New York. EML is a government-owned, government-operated laboratory within the U.S. Department of Energy (DOE) within the Office of Energy Research (ER), Office of Health and Environmental Research (OHER). EML is administered by the DOE Field Office, Chicago (DOE-CH).

EML's primary mission is to conduct environmental research concerning pollutants associated with energy technologies and related national security activities, principally for the purpose of providing scientific information required to determine the consequent effects on human health and the environment.

Secretary of Energy Notice (SEN)-6D-91, *Departmental Organization and Management Arrangements*, assigns the Office of Environment, Safety and Health (EH) to conduct independent internal oversight audits to ensure compliance with laws and sound management practices related to environmental protection. SEN-20-90, *Interaction with Internal and External Oversight Organizations*, emphasizes the concept that the responsibility for ensuring environmentally sound activities starts with line management at the facility level and moves up through DOE line management. The goal of the Environmental Audit Program, as conducted by the Office of Environmental Audit (EH-24), is to provide a continuing program of internal, independent oversight of line management's environmental performance, in support of DOE's broader goal of achieving full compliance and excellence in the environmental area.

1.1 Purpose

The purpose of the Environmental Audit at EML is to provide the Secretary of Energy with concise information on the following issues:

- Current compliance status with environmental regulations (with the exception of the National Environmental Policy Act (NEPA) requirements);
- Application of best management practices (BMPs);
- Adequacy of environmental management programs and organizational structure within EML;
- Identification of causal factors associated with each deficiency to determine root causes; and
- Determination of DOE vulnerabilities and liabilities associated with compliance status, environmental conditions, and management practices.

This information will assist DOE in determining the patterns and trends in environmental compliance and BMP, and will provide EML management with information to identify root causes and determine necessary corrective actions.

1.2 Scope

The scope of the EML Environmental Audit was comprehensive, covering all relevant environmental media, Federal and state regulations and requirements, BMPs, and DOE Orders. The environmental disciplines addressed in the Audit include: Surface Water/Drinking Water, Waste Management, Toxic and Chemical Materials, Air, Radiation, Quality Assurance, and Inactive Waste Sites. Due to the fact that EML is located on the fifth floor of a Federal office building in New York City, New York, and the activities at the remote field site in Chester, New Jersey are limited to ambient environmental monitoring, the Audit Team did not identify issues relating to the disciplines of Groundwater and Soils, Sediments, and Biota. In addition, the Audit included a review of the effectiveness of the environmental management program. Because auditing NEPA activities is the responsibility of the U.S. Department of Energy Headquarters (DOE-HQ), Office of NEPA Oversight (EH-25), NEPA compliance issues were not audited and are not part of this report.

1.3 Approach

The EML Audit was conducted in accordance with the draft *DOE Environmental Audit Program Guidance* (September 1991), *Environmental Audit Manual* (January 1990), and followed accepted audit techniques. The Environmental Audit was conducted by a team of professionals managed by a Team Leader and Assistant Team Leader from EH-24, with technical contractor support personnel. The names, responsibilities, affiliations, and biographical sketches of the team members are provided in Appendix A.

The EML Environmental Audit included three phases: planning, onsite activities, and reporting. During the planning phase, EH-24 sent a memorandum to EML announcing the Audit and requesting information about the site. A pre-Audit site visit was conducted on November 8, 1991. Information gathered in response to the information request and site visit formed the basis for the Environmental Audit Team's Audit Plan, which is provided in Appendix B. As more information was obtained and additional areas of interest were identified, the onsite agenda was modified. The final daily Environmental Audit agenda is contained in Appendix C.

Onsite activities for the EML Audit took place from December 2 to 13, 1991. Onsite activities included document reviews, interviews with EML personnel and personnel from Federal agencies, reviews of previous audits, and observation of actual operations. DOE-HQ and DOE-CH personnel were also interviewed. The team held daily debriefs, which were open to both EML and regulatory personnel. Environmental Protection Agency (EPA) Region II, Radiation Branch, participated in the Audit. The list of documents reviewed and interviews conducted are provided in Appendices D and E, respectively. Using these sources of information, the team developed the findings as discussed in the following sections.

Each problem identified by the Environmental Audit Team has been categorized as either a compliance finding (CF) or a best management practice finding (BMPF). CFs are conditions that, in the judgment of the Environmental Audit Team, may not satisfy environmental regulations, DOE Orders (including internal DOE Memoranda, where referenced), internal environmental site policies, and operation standards. BMPFs are derived from regulatory agency guidance, accepted industry practice, best professional judgment, and draft DOE

Orders. Within these categories, the findings are prefaced by a statement of the performance objective. The performance objectives specify the standards that were not being met. The findings are not arranged in order of relative significance.

Site operations and management were also reviewed for noteworthy practices, which are activities or programs that have general application to other DOE facilities and warrant documentation for information transfer among DOE facilities. The presence or absence of noteworthy practices should not be viewed as a measure of performance. The identification of noteworthy practices provides the opportunity to identify innovative and cost-efficient solutions, thereby improving the effectiveness of DOE in meeting production goals in a way that is consistent with environmental goals.

The intent of the Environmental Audit is to go beyond the identification of individual findings and to identify causal factors which suggest root causes. Root causes are the most basic, fundamental cause, which, if corrected, will prevent recurrence. When developing root causes, an identification of causal factors contributing to the finding is conducted. The definition of the commonly used causal factors are presented in Appendix F. If one or more of these causal factors can be identified as contributing to a finding, it is included in the supporting information for that finding. The causal factors are further evaluated by the facility to determine the root causes and design a comprehensive corrective action plan to rectify each individual finding and overall deficiencies.

1.4 Historical Background and Facility Description

EML occupies the entire fifth floor (approximately 75,000 square feet) of a 12-story Government Services Administration (GSA)-owned building on the border of Greenwich Village and SoHo, in New York City, and has been at this location since 1959 (see Figure 1-1). Unlike the national laboratories, which are operated under contract with the DOE, EML's employees are Federal civil servants and the current personnel ceiling is 87 full time equivalents (FTEs). The current operating budget is 7 million dollars per year, and is expected to remain stable over the near future.

EML is a direct descendent of an industrial hygiene laboratory that was formed in 1947 as the Medical Division within the New York Operations Office of the Atomic Energy Commission (AEC). The Division was involved in industrial hygiene activities in the Northeastern U.S. associated with the Manhattan Project. In 1949, the Medical Division was redesignated the Health and Safety Division and provided support in maintaining control of airborne dusts, radiation hazards, and fire and safety in AEC Contractor plants. In 1952, the Laboratory's activities became focused on radioactive fallout and environmental problems relating to industrial hygiene, and technical responsibility was transferred to the Division of Biology and Medicine at AEC headquarters, Washington, DC. In 1953, the name was changed to the Health and Safety Laboratory (HASL). Throughout the remainder of the decade, and all through the 1960's, the scientific emphasis remained stable as HASL concentrated on nuclear programs and industrial hygiene. In 1975, the AEC was abolished and HASL became part of the newly formed Energy Research and Development Administration (ERDA). In 1977, ERDA was absorbed by the DOE and the laboratory was renamed the Environmental Measurements Laboratory (EML). Throughout its history, EML has participated in the programs of world-wide collection and documentation of radioactive fallout and other pollutants, in the atmosphere, on land, and in surface water bodies.

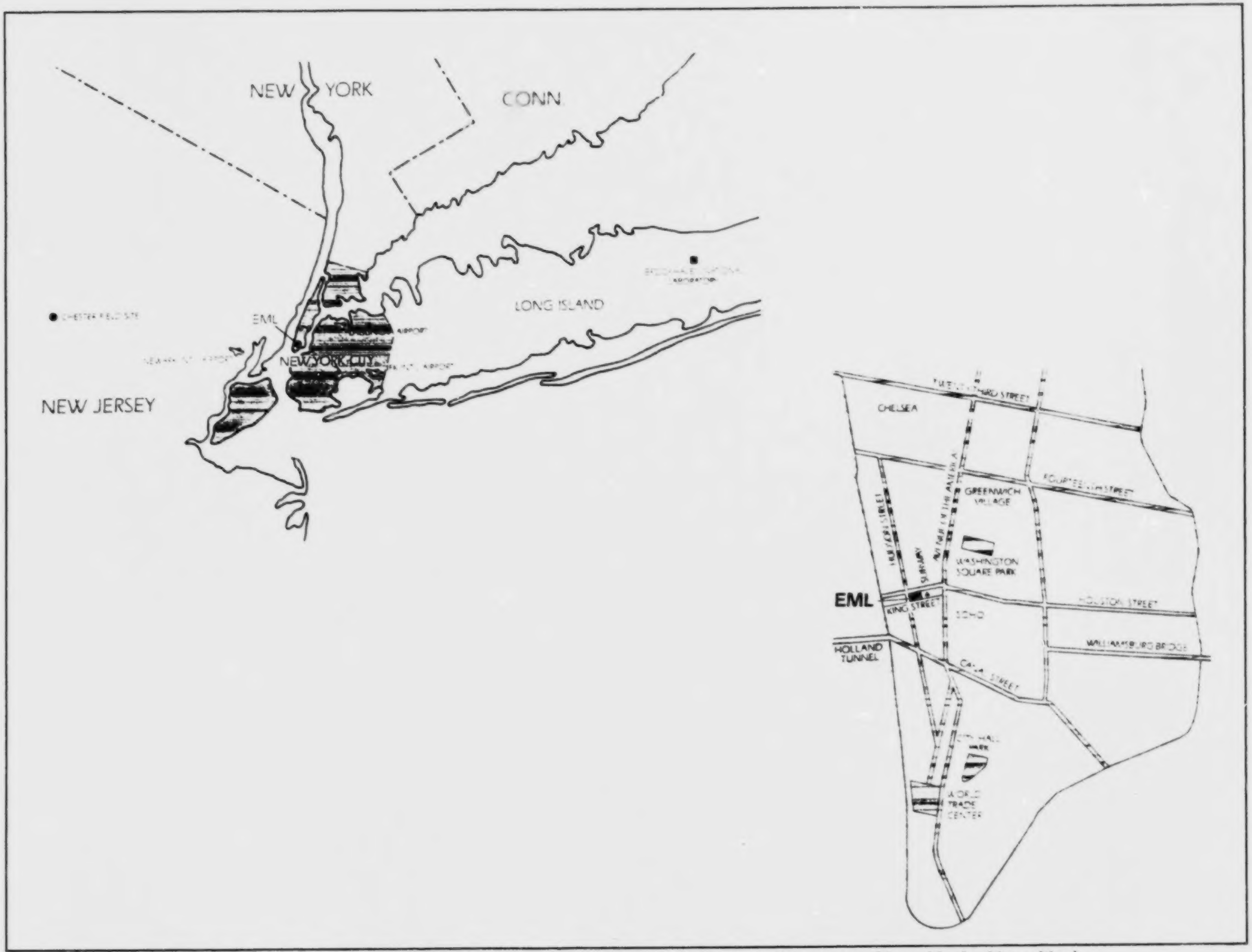
NEW YORK
CONN.
CHESTER FIELD SITE
EML
LONG ISLAND
BROOKHAVEN NATIONAL LABORATORY
AIRPORT
NEWARK INT. AIRPORT
NEW YORK CITY
INT'L AIRPORT
NEW JERSEY
TWENTY-THIRD STREET
CHELSEA
FOURTEENTH STREET
GREENWICH VILLAGE
HUDSON STREET
SUBWAY
AVENUE OF THE AMERICA
WASHINGTON SQUARE PARK
EML
KING STREET
SOHO
HOUSTON STREET
WILLIAMSBURG BRIDGE
HOLLAND TUNNEL
CANAL STREET
CITY HALL PARK
WORLD TRADE CENTER

Figure 1-1. Location of DOE Environmental Measurements Laboratory, New York, New York

EML's infrastructure includes office work space, a computer center, a library, standard chemistry laboratories containing fume hoods and muffle furnaces, electronics assembly and testing workspace, a computer-aided drafting facility, darkrooms for photo and printed circuit board production, and neutron and gamma-ray radiation source calibrations areas. Additional specialized facilities include a clean room, a high altitude test chamber (HATCH), a radon room, a machine shop, a research boat, a mobile laboratory, and extensive sample archives. Motor vehicle bays, storage areas, and a soil processing laboratory are contained on the ground floor and in the basement. Additional storage areas are located on the ground floor and in the basement. An air monitoring station is located on the roof of the GSA building. In addition, a rural field site, located in Chester, New Jersey, serves as a regional baseline monitoring station.

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SECTION 2.0

SUMMARY OF ENVIRONMENTAL AUDIT FINDINGS, KEY FINDINGS, CAUSAL FACTORS, AND SPECIAL ISSUES

2.0 SUMMARY OF ENVIRONMENTAL AUDIT FINDINGS, KEY FINDINGS, CAUSAL FACTORS, AND SPECIAL ISSUES

This section presents a summary of the findings by technical discipline, a discussion of overall key findings, and an evaluation of apparent causal factors. The findings are organized by discipline and categorized as either compliance findings (CFs) or best management practice findings (BMPFs). Each finding is numbered based on the specific technical discipline involved (i.e., Finding WM/CF-1 is the first compliance finding in the Waste Management discipline). References within the discussion of each finding may include interviews, documents, and other findings. A list of documents reviewed is provided in Appendix D. A list of interviews conducted is provided in Appendix E. Documents are organized by discipline and are in numerical order (i.e., D-RAD-2). Interviews are also organized by discipline and are in numerical order (i.e., I-EM-7).

2.1 Findings Summary

The Environmental Audit Team identified 21 findings (see Figure 2-1) in the Audit of the Environmental Measurements Laboratory (EML). None of the findings reflect situations that present an immediate danger to public health or the environment.

The number of findings identified by this audit process does not directly relate to the significance of the problems which exist at facilities. It would be inappropriate to compare the performance of EML to other National Laboratories based solely on a tabulation of the number of findings. In addition, the sequencing of technical disciplines and the numbering of findings do not reflect a prioritization of concerns or anticipated corrective action.

The scope and depth of the information collection process is not intended to be so exhaustive as to identify every compliance problem at EML, but rather to compile a representative sampling of information to develop a broad understanding and awareness of the compliance issues which exist at this time, and to identify the range of issues and causes.

A total of 21 findings were identified in this Audit. Ten of the findings are CFs; activities or conditions which, in the judgment of the Environmental Audit Team, may not satisfy Federal, state, or local environmental regulations, or DOE and DOE Field Office, Chicago (DOE-CH) Orders. Eleven of the findings were identified by the team as BMPFs. This terminology is used in engineering and environmental management where specific regulatory guidance is lacking or inappropriate. BMPFs are derived from regulatory agency guidance, accepted industry practices, and professional judgment. In some findings in this report, best management practices (BMPs) are identified with the discussion of a CF and not listed separately.

The third type of finding that is evaluated in the audit process, is the noteworthy practice finding. It involves environmental practices which, in the judgment of the team, will have general application to other DOE facilities/operations. No noteworthy practice finding was identified as part of this Audit; however, this is not an indication of a deficiency.

The titles of the findings are presented in Table 2-1 by media or discipline, as appropriate. The findings are cross-referenced in the discussion when further explanation and clarification of issues is helpful.

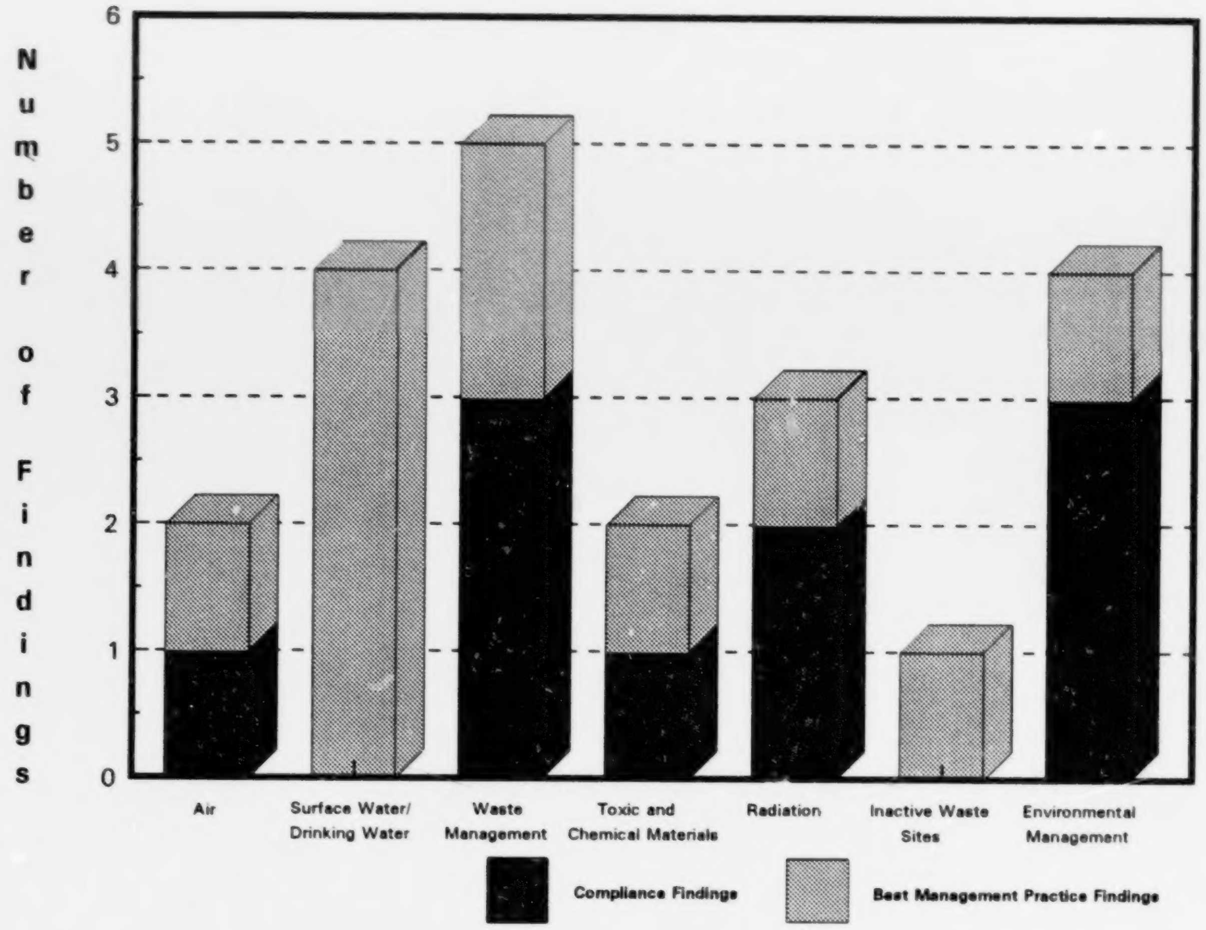

Figure 2-1. Total Findings by Discipline

Table 2-1

Environmental Audit Team Findings

Finding Number	Title of Finding	Page
Air (A)		
A/CF-1	National Emission Standards for Hazardous Air Pollutants (NESHAP) for Radionuclides	3-4
A/BMPF-1	Control of Air Emissions	3-5
Surface Water/Drinking Water (SW)		
SW/BMPF-1	Backflow Prevention in Potable Water Distribution System	3-10
SW/BMPF-2	Retesting for Lead in Water Coolers	3-12
SW/BMPF-3	Procedures for Discharge of Laboratory Wastes	3-13
SW/BMPF-4	Determination of Wastewater Discharge Criteria	3-14
Waste Management (WM)		
WM/CF-1	Hazardous Waste Determinations	3-21
WM/CF-2	Adherence to Internal Hazardous Waste Management Procedures	3-23
WM/CF-3	Radioactive Waste Management Program	3-25
WM/BMPF-1	EML Hazardous Waste Management Procedures	3-26
WM/BMPF-2	Medical Waste	3-29
Toxic and Chemical Materials (TCM)		
TCM/CF-1	Pollution Prevention Awareness Program	3-34
TCM/BMPF-1	Material Safety Data Sheets for Chemicals	3-35
Radiation (RAD)		
RAD/CF-1	Environmental As Low As Reasonably Achievable (ALARA) Program	3-42
RAD/CF-2	Procedures for the Survey and Release of Potentially Contaminated Materials and Equipment	3-43
RAD/BMPF-1	Radiological Sampling Program in the Isotope Preparation Room	3-44
Inactive Waste Sites (IWS)		
IWS/BMPF-1	Community Right-to-Know Hazardous Substance Reporting	3-48

Table 2-1

Environmental Audit Team Findings

Finding Number	Title of Finding	Page
Environmental Management (EM)		
EM/CF-1	Environment, Safety, and Health Internal Appraisal and Self-Assessment Programs	3-52
EM/CF-2	Formality of Environmental Protection Program	3-54
EM/CF-3	Environmental Protection Provisions in Agreements and Contracts	3-56
EM/BMPF-1	Environmental Protection Program Staffing and Training	3-57

Air

There are three principle air emission points at EML: the exhaust for the laboratory hoods; the exhaust from other various shop hoods; and the exhaust from the basement aerosol laboratory. EML has a number of lessor air emission points resulting from the operation of small ventilation systems dedicated to serving one room or piece of equipment. Concerns identified during the Audit include the determination of regulatory requirements that may apply to emissions of toxic and/or volatile contaminants and the demonstration of compliance with National Emission Standards for Hazardous Air Pollutants for radionuclides.

Surface Water/Drinking Water

All wastewater is discharged from EML via the communal drain system of the General Services Administration (GSA) office building to the New York City sanitary sewer. GSA is the official tenant to the public sewer and is not required to conduct any discharge monitoring. EML represents the only significant source of potential chemical discharge (excluding maintenance activities) from the GSA building to the sewers. EML does not conduct effluent monitoring. Drinking water is obtained from the New York City public water purveyor. Concerns identified during the Audit include the determination of regulatory requirements related to wastewater discharge, the development of a backflow prevention program, retesting for lead in water coolers, and procedures for discharge of laboratory wastes.

Waste Management

Hazardous wastes generated at EML consist of spent cleaning solutions, spent solvents, and various waste solutions that exhibit hazardous characteristics. Small amounts of hazardous wastes are also generated from operations of the machine shop, the photographic processing laboratory, and printed circuit board etching facility. EML is a conditionally exempt, small quantity generator. Small quantities of low-level radioactive wastes are generated from certain analytical procedures involving radioactive tracers and standards. Potentially infectious wastes are generated as a result of the continuing program at EML to measure strontium in human bone tissue. GSA has responsibility for collection, transportation, and disposal of solid wastes generated at EML, however, EML has responsibilities for, and is currently conducting, a recycling program of white waste paper. Concerns identified during the Audit include lack of characterization of hazardous waste, development of and adherence to hazardous waste management procedures, development of a formal radioactive waste management program, and determination of the regulatory requirements related to medical waste management.

Toxic and Chemical Materials

EML stores and utilizes toxic and chemical materials as part of its research activities. The stock room stores commonly used materials for distribution to the various laboratories and shops. EML does not have any equipment containing polychlorinated biphenyls (PCBs) onsite. Building maintenance activities are conducted by GSA and, therefore, GSA has primary responsibility for asbestos abatement and disposal. Concerns identified during the

Audit include the availability of Material Safety Data Sheets (MSDSs) for all chemicals onsite, and the need for a Pollution Prevention Awareness Program (PPAP).

Quality Assurance

EML Institutional Quality Assurance Plan is designed to provide quality assurance guidance solely for research efforts. EML does not conduct any environmental protection monitoring or surveillance activities, and hence no quality assurance plan exists for these activities. No findings were identified in the area of quality assurance.

Inactive Waste Sites

EML operates two facilities, the laboratory located on the fifth floor of a GSA office building located in New York City, and a remote field sampling site located in Chester, New Jersey. Neither site is listed on, or under consideration for, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List (NPL), or the Federal Facilities Compliance Docket. Based on the nature of operations at both of the facilities, the potential for a release of CERCLA hazardous substances is considered to be minimal. However, under the New York City Community Right-to-Know Act, facilities that store listed hazardous substances in excess of the Threshold Reporting Quantity (TRQ) must submit annual reports. EML was unaware of the local Community Right-to-Know requirements and, consequently, did not submit the required information.

Radiation

EML's inventories and routine uses of radioactive materials reflect those of a low-level environmental research laboratory. EML does not conduct ongoing radiological liquid or air effluent sampling. Concerns identified were the lack of a formal "as low as reasonably achievable" (ALARA) program, development of procedures for the survey and release of potentially contaminated materials and equipment, and development of procedures for radiological sampling.

Environmental Management

EML has defined its environmental risk as low and, consequently, EML's environmental protection program is minimal. Overall, EML has not been proactive in its environmental compliance activities. Its current environmental protection program is informal; plans and procedures to control the conduct of these operations have not been completed. Specific concerns identified during the Audit include informality of the general environmental protection program, the absence of a formalized internal appraisal/self-assessment program, inadequate staffing and training with respect to environmental protection, and the lack of a formalized system to include environmental protection provisions in agreements and contracts.

2.2 Key Findings

The key environmental findings identified by the Audit Team, which cross all disciplines, are discussed below.

Determination of Environmental Statutes, Regulations, and DOE Orders. EML has not determined the "operating envelope" of environmental regulations and DOE requirements associated with all facets of its operations. The lack of this "operating envelope" contributed to many findings within this Audit. Specifically, EML has not fully evaluated the impact of environmental regulations and DOE directives pertaining to its activities, and has not determined its potential liabilities and compliance status. Related findings include: A/BMPF-1, SW/BMPF-4, WM/CF-1, WM/BMPF-2, RAD/CF-1, IWS/BMPF-1, and EM/CF-2.

Informality of Environmental Protection Program. An overall tendency toward informality of operations is a common theme in many findings within this Audit. The informality is seen at all levels of the organization and is reflected in the lack of formal procedures and policy implementation guidance. It appears that the environmental risks at EML are small; nonetheless, preparation and implementation of formal written procedures are critical to achieving environmental "excellence." Related findings include: SW/BMPF-3, WM/CF-2, WM/BMPF-1, RAD/CF-2, and EM/CF-2.

Self-Assessment Program. DOE Memorandum dated January 26, 1990, directs that all line management organizations institute a formalized self-assessment program. EML conducted its first internal environment, safety, and health (ES&H) appraisal in October 1991, to serve as the foundation for their self-assessment program. A self-assessment committee has been convened to develop a self-assessment program. However, EML is currently in the beginning stage of development of a self-assessment program (see Finding EM/CF-1).

2.3 Causal Factors Summaries

In an effort to understand why a finding occurred, a systematic approach was initiated to perform a "probable root cause" analysis. Root cause analysis is a two-step process which first identifies causal factors, and then identifies the root cause which is the most basic, fundamental cause, which, if corrected, will prevent recurrence.

The cause(s) and rationale(s) in support of the causal factors are identified in supporting information for each finding. The majority of these apparent causal factors are judgment calls of the team members. EML should perform the final detailed causal factor analysis to correct all causal factors which have contributed to the finding. Although the identified causal factors for a particular finding may be incomplete, it is still EML's responsibility to address each one in the Corrective Action Plan.

The Environmental Audit identified eight apparent causal factors which contributed to the occurrence of the findings (see Table 2-2 and Figure 2-2). The three factors that appeared most frequently are policy implementation, procedures, and training. Each of these causal factors is discussed below. Definitions of causal factors typically used in the audit process are presented in Appendix F.

Table 2-2
Summary of Apparent Causal Factors Identified by Audit Finding

Finding Number	Apparent Causal Factors													
	Policy	Policy Implementation	Risk	Procedures	Personnel	Resources	Training	Change	Appraisals/Audits/Reviews	Design	Human Factors	Barriers and Controls	Supervision	QA/QC
Air (A)														
A/CF-1		✓												
A/BMPF-1		✓												
Surface Water/Drinking Water (SW)														
SW/BMPF-1		✓	✓											
SW/BMPF-2				✓										
SW/BMPF-3		✓		✓										
SW/BMPF-4		✓		✓										
Waste Management														
WM/CF-1							✓						✓	
WM/CF-2				✓			✓						✓	
WM/CF-3		✓							✓					
WM/BMPF-1		✓		✓			✓							
WM/BMPF-2		✓		✓										

Table 2-2
Summary of Apparent Causal Factors Identified by Audit Finding

Finding Number	Apparent Causal Factors													
	Policy	Policy Implementation	Risk	Procedures	Personnel	Resources	Training	Change	Appraisals/Audits/Reviews	Design	Human Factors	Barriers and Controls	Supervision	QA/QC
Toxic and Chemical Materials (TCM)														
TCM/CF-1		✓												
TCM/BMPF-1				✓										
Radiation (RAD)														
RAD/CF-1		✓												
RAD/CF-2		✓		✓										
RAD/BMPF-1				✓										
Inactive Waste Sites (IWS)														
IWS/BMPF-1		✓					✓							
Environmental Management (EM)														
EM/CF-1		✓		✓		✓	✓	✓						
EM/CF-2		✓		✓			✓							
EM/CF-3		✓						✓						
EM/BMPF-1						✓	✓	✓						
Totals	0	15	1	11	0	2	7	3	1	0	0	0	2	0

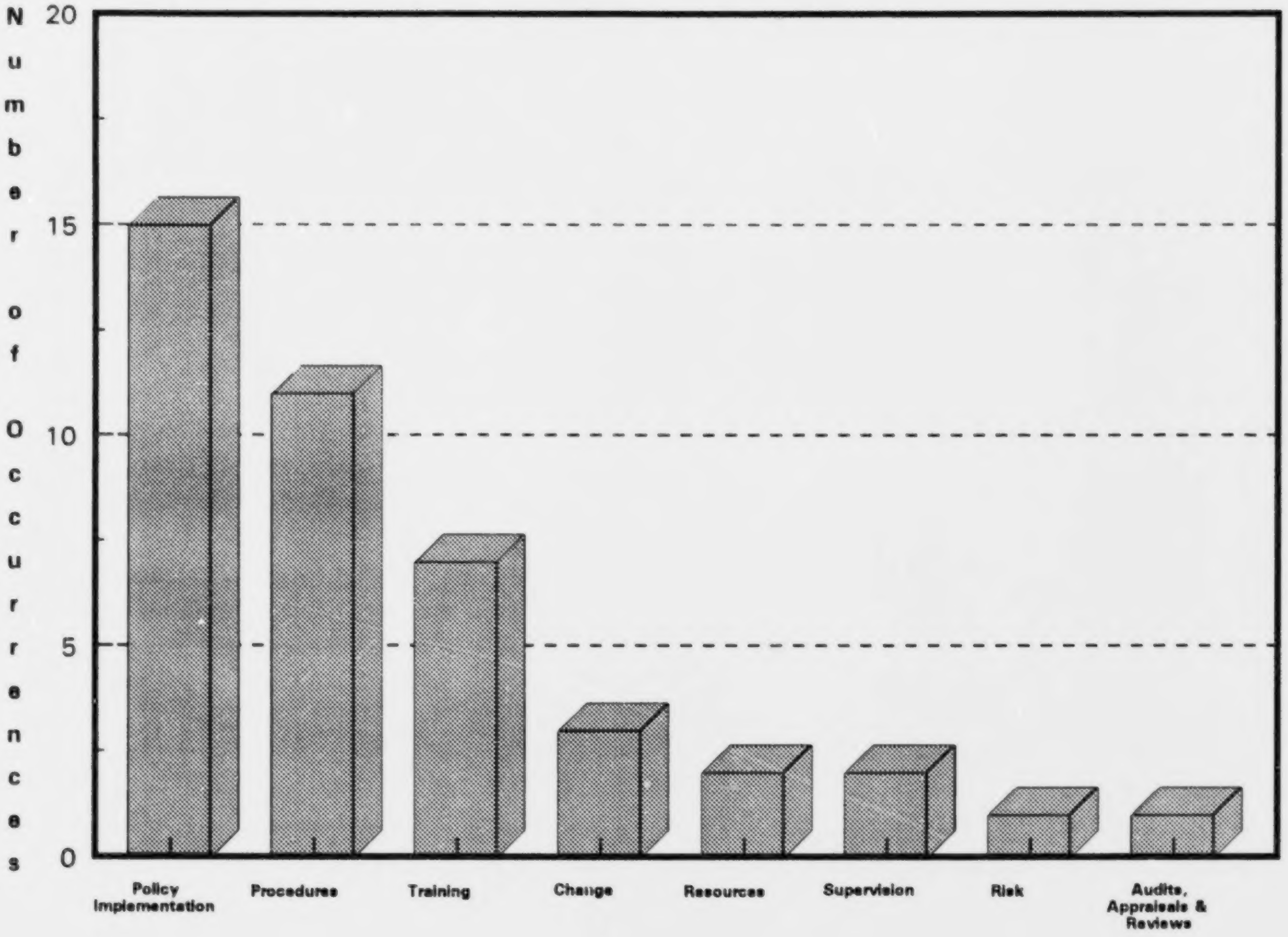

Figure 2-2. Number of Findings Per Causal Factor

Policy Implementation--appears most frequently, in 71 percent of the findings, and was evident in seven of the eight disciplines evaluated. EML has assumed that its activities have limited potential for adverse environmental impact and, therefore, fall below levels of regulatory concern. Consequently, EML has not fully considered environmental regulations and DOE Orders, assuming they are not applicable to its operations.

Procedures--is a causal factor in 52 percent of the findings and was evident in five of the eight disciplines evaluated. Failure to develop and implement formal environmental procedures is evident throughout the environmental protection program, specifically in the areas of hazardous and radioactive waste management, discharge to building drains, and radiological sampling.

Training--33 percent of the findings demonstrate a lack of personnel training on implementing requirements to comply with relevant DOE initiatives and regulations for environmental compliance.

One additional causal factor, Resources, was identified solely in the Environmental Management findings. The level of resources available is a key factor in establishing a comprehensive environmental protection program at EML.

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SECTION 3.0

ENVIRONMENTAL AUDIT FINDINGS

3.0 ENVIRONMENTAL AUDIT FINDINGS

3.1 Air

3.1.1 Overview

The purpose of the Air portion of the Environmental Audit was to evaluate Environmental Measurements Laboratory's (EML's) compliance with: Federal regulatory requirements promulgated by the Environmental Protection Agency (EPA) under the authority of the Clean Air Act; state and local regulations and standards pertaining to discharges of air contaminants; DOE Orders; and Best Management Practices (BMPs). Table 3-1 provides a complete list of statutes, regulations, and Orders considered in this evaluation.

The scope of the Audit activities included: (1) inspections of air emission sources; (2) interviews with EML personnel; (3) interviews with state and Federal regulatory personnel; and (4) reviews of air permit guidances issued by the State of New York.

EPA has promulgated emission standards and other implementing regulations for the Clean Air Act in 40 CFR 50-88. Under the authority of the Environmental Conservation Act, the New York State Department of Environmental Conservation (NYSDEC) has also promulgated air emission control regulations in Title 6 of the New York Compilation of Rules and Regulations (NYCRR), Parts 200 et seq. In addition, NYSDEC has promulgated chemically specific emission standards for various toxic and/or volatile chemicals. These standards include both short term emission limits (averaged over a 24 consecutive hour period) and annual emission standards. EPA has authorized NYSDEC to implement the Federal program for control of emissions from stationary sources, including enforcement of National Emission Standards for Hazardous Air Pollutants (NESHAP), except the NESHAP standards for radionuclide emissions. EPA has retained primacy for enforcement of radionuclide emission standards.

There are three principle air emission points at EML. The first is the common exhaust point for 22 chemical vapor control hoods located throughout the six laboratories of the Analytical Chemistry Division. Ventilation air for this system is exhausted at roof level by means of an induced draft fan (located in a mechanical penthouse) which operates continuously. The second exhaust point is also at roof level. Flow consists of exhausted air from eight other miscellaneous ventilation control points located in other areas of EML, such as the machine shop and photoprocessing laboratory. The fan for this ventilation point also operates continuously. The third principle air emission point is the exhaust from the ventilation systems located in the basement aerosol laboratory. Two induced draft fans located within the laboratory are capable of exhausting air from various aerosol testing chambers in the laboratory through a common riser to a discharge point at the building roof. This system was operated only during active experiments and has not been used for nearly ten years.

In addition to the above emission points, EML has a number of lessor air emission points with flow resulting from the operation of small ventilation systems dedicated to servicing one room or one piece of equipment. Typically, atomic absorption spectrometers and gas chromatography/mass spectrometry instruments are served by such dedicated systems, which are operational only during the period when the instruments are running. Such small dedicated ventilation systems normally discharge directly out the side of the building.

Table 3-1

List of Air Regulations, Requirements, and Guidelines

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
DOE 5400.1	General Environmental Protection Program	DOE
DOE 5400.5	Radiation Protection of the Public and the Environment	DOE
40 CFR 50-88	Clean Air Act Implementing Regulations	EPA
6 NYCRR 200-257	Air Quality Regulations and Standards	NYSDEC

EML has, however, estimated discharges to the atmosphere of their most widely used acids by utilizing the annually purchased amounts for those chemicals, and applying what is believed to be a conservative estimate, that 25 percent of that annual amount would be exhausted to the atmosphere. No similar calculations have been made for volatile organic chemicals that may also be emitted through EML exhaust points and for which there are published NYCRR emission standards.

With respect to radionuclide emissions, EML is currently negotiating with EPA Region II to determine the best method by which EML can demonstrate compliance with NESHAP emission standards for radionuclides promulgated in 40 CFR 61, Subpart H. EML proposes the use of "AIRDOS PC," an EPA approved air dispersion code for calculations of dose to the general public from radionuclide emissions. EML and EPA have agreed that EML will perform a calculation which utilizes current radioisotope inventories, and applies other conservative factors to derive a conservative radionuclide release rate that will serve as the source term in the AIRDOS model.

In addition, EML is continuing to make measurements within the Isotope Preparation Room to determine whether radioactive aerosols are being generated during sample preparations. The two measurements completed to date indicated that radioactive aerosols were not generated during these sample preparation activities.

Finally, EML operates a number of ambient air monitoring and sampling devices on the roof of the New York City facility. However, operation of this equipment is the result of EML conducting its primary research mission. Sampling and monitoring results obtained with these instruments are not necessarily suitable for application to EML's own air emission surveillance responsibilities, and EML has no intention of utilizing those results for such purposes.

Intuitively, air emissions from EML are expected to be quite low and below levels of regulatory concern under normal operating conditions. However, EML has not yet developed a formal program by which compliance with air emission standards can be demonstrated. EML also has not discussed with NYSDEC officials its potential responsibilities relative to each EML air emission point.

One compliance finding and one best management practice finding have been identified in the Air portion of the Environmental Audit. The compliance finding relates to EML's failure to adequately assess the potential for release of radioactive materials to the environment as required by NESHAP. The best management practice finding relates to EML's failure to completely define the regulatory envelope relating to emissions of toxic and volatile air contaminants from EML.

3.1.2 Findings

A/CF-1: National Emission Standards for Hazardous Air Pollutants (NESHAP) for Radionuclides

Performance Objective: Subpart H of 40 CFR 61 establishes National Emission Standards for Emissions of Radionuclides other than Radon from Department of Energy Facilities. Paragraph 61.93(b)(4)(ii) requires that an evaluation be conducted to determine whether each potential release point is subject to the emission measurement requirements of 61.93(b), using emission rate estimates that assume no pollution control equipment. Paragraph 61.94(a) requires a certified, signed, and dated annual report to the Environmental Protection Agency (EPA) headquarters and the EPA region by June 30, that requires the dose calculations required by Paragraph 61.93(a) for the previous calendar year.

Finding: An evaluation of the potential air releases of radioactive material from the Environmental Measurements Laboratory (EML) has not been fully completed to demonstrate compliance with the requirements of 40 CFR, Subpart H.

Discussion: The Environmental Protection Appraisal conducted by the DOE Field Office, Chicago (DOE-CH) in November 1990, recommended that EML formally demonstrate compliance with 40 CFR 61, Subpart H, by a method that is found acceptable to EPA Region II (D-A-5). To date, EML has made an effort towards meeting the full requirements of the standard. EML management has identified only one potential source of radionuclide emissions, the isotope preparation room, located on the 5th floor of the facility. Two samples have been taken in the isotope preparation room during the preparation of reference standards to determine whether or not radioactive aerosols are generated during the process. There is no evidence that airborne radioactivity is generated during sample preparations, based on the results of these two measurements.

EML plans to demonstrate compliance with NESHAP using a calculational method which involves applying selected emission factors to the total inventory of radionuclides in order to derive an estimated release rate. Using the derived annual release rate, estimates of dose to the general population for radionuclides are included in the AIRDOS PC code (D-A-2). EPA has verbally indicated that submittal of documentation in early 1992 is acceptable.

Although EML is addressing this issue and has had correspondence with EPA Region II, EML has not submitted any documentation to EPA demonstrating compliance. According to the Agreement and Commitments identified in the DOE-CH Appraisal Report, EML was to have formally demonstrated compliance with 40 CFR 61, Subpart H, using an EPA-approved method by June 1, 1991.

The apparent causal factor for the finding is a lack of necessary policy implementation to complete the task.

A/BMPF-1: Control of Air Emissions

Performance Objective: New York State regulations, 6 NYCRR 200 et seq., establish emission standards for release of toxic and/or volatile chemicals to the air, and also establish administrative requirements for air emission sources, including operating permits.

Finding: The Environmental Measurements Laboratory (EML) has not determined the regulatory requirements that may apply to its air emission sources, especially with respect to toxic and/or volatile chemicals.

Discussion: Based on telephone conversations in 1989 with representatives of the Air Toxics Bureau of the New York State Department of Environmental Conservation (NYSDEC), EML has determined that its air exhaust points qualify for the categorical exemption from permit requirements provided in 6 NYCRR 201.6(j) for exhausts from laboratory hoods (D-A-1). However, neither the results of those telephone conversations nor any subsequent efforts by EML to demonstrate the applicability of this exemption have been documented to the record.

Ventilation systems, such as the one in operation at EML that serves the machine shop area, and other miscellaneous sources, may not necessarily qualify for the laboratory hood exemption in 6 NYCRR 201.6(j) (I-A-2 and I-A-3). Furthermore, those activities capable of emitting toxic or volatile chemicals may be subject to chemically specific emission standards also published by NYSDEC. Both short term (averaged over 24 consecutive hours) and annual emission standards for certain toxic and volatile chemicals have been promulgated by NYSDEC.

The activities at EML that are capable of emitting toxic or volatile contaminants for which there are NYSDEC standards are quite limited in scope. Although a strong argument can be made that rates of toxic and volatile chemical releases from EML emission points are below regulatory concerns, EML has not made a deliberate effort to document this to be the case, and has not sought written concurrence by NYSDEC that EML falls outside regulatory controls, or otherwise qualifies for categorical exemptions from those controls.

The apparent causal factor for this finding is a lack of policy implementation to determine all regulatory requirements.

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3.2 Surface Water/Drinking Water

3.2.1 Overview

The purpose of the Surface Water section of this Audit was to evaluate the discharge of wastewater from Environmental Measurements Laboratory (EML) with respect to Federal, state, and local regulations. The Audit also assessed EML's activities and programs designed to provide safe drinking water to its employees. The specific regulations, requirements, and guidelines used to evaluate EML during this assessment are provided in Table 3-2.

The scope of this assessment included: a review of appropriate regulations and telephone communication with state and local regulators regarding sewer discharge limitations; review of the EML procedures for the handling and disposal of chemical liquids; interviews with EML personnel responsible for the disposal of liquids down sink drains; a review of plumbing drawings for water supply and wastewater discharge at EML; interview with General Services Administration (GSA) personnel concerning backflow prevention within the GSA building; and a walkthrough of selected laboratories, instrument shops, and the materials storeroom to observe potential routes of discharge to wastewater systems.

The focus of the Surface Water assessment was the disposal of liquid wastes via the communal drain system of the GSA building. All wastewater discharged from EML flows through the building plumbing system to the New York City sewers. There is no segregation of EML wastewaters, and no flow meters or traps between the GSA plumbing system and the city sewers. The EML represents the only significant source of potential chemical discharge (excluding building maintenance activities) from the GSA building to the sewers. According to GSA personnel, the wastewater discharge from EML has not caused any noted adverse effects to the building plumbing. GSA is the official tenant to the public sewer and is not required to conduct sewer discharge monitoring. GSA considers the discharge from the building to be not significantly different from wastewater discharge from a standard GSA office building.

Each of the four main wet chemistry laboratories at EML contain a floor drain, two or three bench sink drains, and up to four hood drains. Routine releases of liquid wastes are the discard of chemicals and equipment washout at the bench drains. A minor amount of liquid condensate and condenser cooling water is discharged via the hood drains. Floor drains also collect minor amounts of contaminants from janitorial floor cleanup operations (although at least one analytical laboratory forbids liquid washing of the floors in order to prevent sample contamination).

There is one sink drain in both the circuit board etching room (Room 544M) and in the photographic development room (Room 544N). Work is done infrequently in either area, and there may be only two or three discharges of washwater from these areas in any year. There is no silver ion collection trap in the photo room sink, however, the EML has discontinued the disposal of photochemicals down the sink (D-SW-11). There are no floor drains in either room. There is one sink drain and one floor drain in the machine shop (Room 554T). There are no regular liquid discharges from this area. There are no floor drains or sinks in the chemical storeroom (Room 541). Wastewater from EML washrooms is also discharged via the common GSA building plumbing system.

Table 3-2

List of Surface Water/Drinking Water Regulations, Requirements, and Guidelines

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
DOE 5400.1	General Environmental Protection Program Requirements	DOE
DOE 6340.1A	General Design Criteria	DOE
40 CFR 141	National Primary Drinking Water Regulations	EPA
6 NYCRR 380	Rules and Regulations for Prevention and Control of Environmental Pollution by Radioactive Materials	New York State Department of Environmental Conservation (NYSDEC)
Administrative Code of the City of New York Sections 683a4-1.0 through 19.0, 687-1.0, 689-1.0	Rules and Regulations Relating to the Use of the Public Sewers, Including Sewer Discharges	New York City Department of Environmental Protection
Article 175	New York City Health Code Radioactive Control	New York City Department of Public Health

Drinking water is supplied to EML via GSA from the New York City public water system. GSA periodically monitors the water quality throughout the building, including the EML facility. In 1987, EML replaced four drinking water coolers due to concerns over possible lead contamination. All drinking water test data for EML has shown no exceedances of primary drinking water standards.

The only backflow prevention system at the building is between the city potable water main and the building distribution system. There are no backflow preventors in water supply pipes at EML's fifth floor facility.

The total amount of water used at the GSA building in 1990 was approximately 1-2 x 10^9 gallons according to GSA records. There is no separate accounting of EML water use. Overall, the disposal of wastewater at EML represents a low risk of introducing contamination to surface waters or the environment beyond the EML boundaries.

There are four Surface Water best management practice findings at EML identified in this Audit relating to: backflow prevention in potable water pipes; retesting of the lead content in drinking water serviced via the new water coolers; development of procedures for liquids discharged down sink drains; and determination of EML wastewater discharge status.

3.2.2 Findings

SW/BMPF-1: Backflow Prevention in Potable Water Distribution System

Performance Objective: DOE 6430.1A, *General Design Criteria*, under Section 0266, *Water Distribution Systems*, sets forth guidance for the protection of potable water quality at DOE facilities, including the installation of an engineered system to prevent backflow of potentially contaminated water into the building water distribution system. Good management practice dictates the development of a backflow prevention program that includes engineered or administrative controls.

Finding: There is no backflow prevention program within the 5th floor confines of the Environmental Measurements Laboratory (EML), nor in the connections to other areas within the General Services Administration (GSA) building to ensure protection of potable water quality.

Discussion: The DOE has recognized the importance of backflow prevention and requires that new water distribution systems be protected from degradation by installation of backflow prevention assemblies, as necessary, to preclude backflow of contaminants or pollutants into the system (DOE 6430.1a, Section 0266-2). For those facilities with existing potable water distribution systems, it is a best management practice to assess the needs for backflow prevention and either retrofit the hardware of the system, or strengthen the administrative procedures to prevent inadvertent backflow of potential contamination into the system.

In buildings where there are no separate distribution systems for potable water intended for personal consumption and water for process-related activities, the possibility exists for cross-mixing, resulting in the contamination of the consumptive water system. This could occur when a loss of pressure results in a backdraw of potentially-contaminated water into the mains. At EML there is a common potable water distribution system for the laboratory located on the 5th floor and the remainder of the GSA building.

Areas at EML where backflow prevention may be important include faucets in laboratories where water is required for the mixing of chemicals, and in lines which directly connect to cooling systems such as condensers. In the former case, adequate backflow protection may be obtained by ensuring that there is sufficient space between a faucet nozzle (or its hose extension) and vessels which are used for chemical mixing, and implementing administrative procedures to ensure that personnel do not allow direct contact between the nozzle/hose and the chemical. In the latter example, should equipment failure, such as the internal breakage of a condenser, occur coincident with a water system pressure drop, installed backflow preventors would provide the greatest assurance of backflow prevention.

Engineered backflow preventors are devices installed within the water line intended to prevent the backdraw of water into the line in the event of a decrease or loss in water pressure. The devices are designed to work automatically and can be applied to lines ranging in size from individual taps to large distribution mains. Backflow preventors are most commonly installed where potable water distribution lines connect into washing, cooling, or other industrial process use lines.

EML does not have an active backflow prevention program. A review of plumbing diagrams for the EML facility did not indicate that any backflow preventors have been installed in the water distribution system (D-SW-1). Interviews with EML personnel (I-SW-6) and GSA building representatives (I-SW-12 and I-SW-13) indicate that there are no intra-building backflow preventors within the GSA facility. The only backflow protection is via check valves located between the GSA input mains and the city water mains.

The apparent causal factors for this finding include a failure to understand the risk associated with backflow contamination of water mains, and the lack of policy implementation of an effective system of backflow prevention.

SW/BMPF-2: Retesting for Lead in Water Coolers

Performance Objective: The Safe Drinking Water Act as codified under 40 CFR 141.11, establishes a maximum contaminant limit for lead in drinking water of less than 50 parts per billion (ppb). It is a best management practice for a facility to retest the drinking water supply for its employees to ensure that lead concentrations do not exceed the regulatory levels.

Finding: In 1987, four drinking water coolers were replaced by the Environmental Measurements Laboratory (EML) after test data raised concerns about the lead content of the water. No followup tests have been conducted to determine the quality of the water supplied through the new coolers.

Discussion: In January 1986, the General Services Administration (GSA) requested EML's assistance in the testing of lead concentrations in drinking water from fountains throughout the GSA building. The results found several locations in the building where the lead concentration exceeded the 50 ppb standard. None of these locations were within the fifth floor confines of EML. In response to the GSA initiative, EML tested water coolers and fountains on the fifth floor. Test results, reported on October 2, 1987, indicated that the coolers did not exceed the maximum contaminant limit for lead; however, the water from several coolers did exhibit elevated lead concentrations ranging from 15 - 47 ppb (D-SW-5). EML determined that each of the coolers with elevated lead concentration were a common brand manufactured by Halsey Taylor.

Subsequent to this testing, the Environmental Protection Agency (EPA) issued statements regarding lead in drinking water which indicated that: (1) the maximum contaminant level for lead in drinking water may, at some time, be decreased below the 50 ppb standard; and (2) because the Halsey Taylor brand of cooler utilized lead solder joints, the coolers may increase the lead concentration in water dispensed through them (D-SW-4; I-SW-18). In response to the EPA statements, EML removed four suspect Halsey Taylor coolers from service and installed new EPA-approved lead-free coolers. This action represented a good management response to the concern for safe drinking water quality. However, EML has not conducted confirmation sampling to demonstrate that the water supplied at the locations of the new coolers does not contain elevated lead concentrations. Although the original Halsey Taylor coolers were suspected as the cause of the elevated lead concentration originally noted, the initial sampling data could not determine if it was in fact the coolers, or some other factor, perhaps related to fountain location, which caused the elevated lead concentrations noted in 1987. It is a good management practice to resample the drinking water supply at the four new coolers to verify the effectiveness of the new coolers in reducing lead concentration.

The apparent causal factor for this finding is the lack of procedures to complete a testing program for drinking water quality.

SW/BMPF-3: Procedures for Discharge of Laboratory Wastes

Performance Objective: Discharge criteria developed under Federal, state, and local authority may establish limits on the chemical or physical characteristics of wastewater discharged to sewer systems of a Publicly Owned Treatment Works (POTW). It is a best management practice to develop complete written procedures for the discharge of laboratory wastes into the sewer system to ensure that such discharges are in accord with regulatory requirements.

Finding: The Environmental Measurements Laboratory (EML) procedures for the disposal of wastes do not provide adequate guidelines as to the amounts and characteristics of materials that may be disposed of via the sewer drains.

Discussion: The EML guidance for disposing of wastes via sewer drains is contained in Section D of the *Procedures for Accumulation, Storage and Disposal of Hazardous Waste* (D-SW-9). The terms used in describing the procedures for wastewater discharge are imprecise and are not adequately defined (see Finding SW/BMPF-4). For example, Section D.1 states: "Small quantities of diluted acid or basic solutions may be poured down sink drains..." Also, Section D.3 states: "For soluble harmless organics such as sugars, sodium salts, dilute to a concentration of 10 grams per liter before sink drain disposal." Some of these procedures do provide distinct standards (e.g., concentration limit), but such terms as "small," "dilute," and "harmless" are not accompanied by any additional qualifying criteria.

The Audit Team noted two instances where waste liquids were to be discarded without adequate procedures for waste characterization and discharge (see Finding WM/CF-2). In Lab 514, an approximately 5-gallon container of washwater containing nitric acid is used to clean lab glassware. About once each month, the contents of this container is diluted with tap water and discharged down the bench sink (I-SW-4). The free acidity (pH) of this waste solution is estimated at 0.3. There is no information to confirm that this discharge is in accordance with regulatory requirements. Also, in Lab 520 there are at least five 1-pint bottles containing expired atomic absorption spectrophotometric standard solutions containing such constituents as lead, uranium, and thorium at concentrations as high as 1,000 parts per million (ppm). Current chemical waste disposal procedures allow for the discharge of these solutions to the sanitary sewer at the discretion of the staff. The standards were slated for disposal (I-SW-4) at the time of this Audit. There are no specific procedures for the discharge of these standards.

Section D of the *Procedures for Accumulation, Storage and Disposal of Hazardous Waste* notes that the procedures are designed to comply with the maximum contaminant limits for discharge to the New York City Sewer System. However, there is no indication that EML has determined what these contaminant limits are (see Finding SW/BMPF-4).

The apparent causal factors for this finding are a failure of policy implementation and procedures for the discharge requirements of waste liquids down sewer drains.

SW/BMPF-4: Determination of Wastewater Discharge Criteria

Performance Objective: The discharge of wastewaters via a public sanitary, or sewer, system is regulated by local New York City and/or State of New York authority. The New York City Department of Environmental Protection's *Rules and Regulations Relating to the Use of Public Sewer* outlines the discharge criteria for users of the public sewer system. According to Article 175 of the New York City Department of Public Health, DOE facilities are exempt from the specific discharge criteria limitations for radioactive substances. The New York State Department of Environment Conservation under the *Rules and Regulations for Prevention and Control of Environmental Pollution by Radioactive Materials* (6 NYCRR 380), also exercises authority over certain wastewater discharges and may not specifically exempt DOE facilities from discharge limitations. It is a best management practice for a facility to determine and document the specific regulatory requirements which apply to the facility's radioactive/ non-radioactive wastewater discharge.

Finding: The Environmental Measurements Laboratory (EML) has not adequately determined and documented its responsibilities regarding compliance with wastewater discharge criteria with the appropriate regulatory authority.

Discussion: All wastewater from floor drains, sinks, and hoods within individual laboratory rooms, and washrooms at EML are disposed of via direct discharge to the common sewer system in the General Services Administration (GSA) building, which in turn, discharges wastewater to the New York City municipal sewer system. The majority of wastewater discharge sources within the GSA building are typical of routine office building operations such as washrooms, janitorial washwater, air conditioner condensate, and boiler blowdown. The laboratories at EML represent the only source of non-office, non-building maintenance-derived wastewaters. Neither EML nor GSA conducts any pretreatment or storage of wastewater prior to discharge to the city sewer. The GSA is the official permittee with the city sewer district. However, the GSA does not have any formal contract with the city regarding wastewater discharge (I-SW-12).

EML has calculated a mass-balance-derived discharge concentration for some chemical ions and radioisotopes based on annual building discharge and annual chemicals procured. For the chemicals of largest quantity use, EML compared the derived discharge concentrations to the allowable concentrations for drinking water in the Safe Drinking Water Act. EML has no empirical data regarding discharge quality. These calculations have been used by EML to justify the assumption that EML discharges are "orders of magnitude below the concentrations of concern to the Environmental Protection Agency (EPA), New York State, and New York City environmental agencies" (D-SW-10).

EML does not have any documentation from the appropriate authority obviating the EML discharge from regulatory discharge requirements. EML and GSA had little contact with the sewer system authority confirming the regulatory status of the discharge from EML (I-SW-11 and I-SW-12, respectively).

It is a best management practice for EML to determine and document its wastewater discharge requirements with the appropriate regulatory authority.

The apparent causal factors for this finding are a failure in policy implementation and procedures regarding the determination of compliance requirements with local wastewater regulatory authority.

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3.3 Waste Management

3.3.1 Overview

The purpose of the Waste Management portion of the Environmental Audit was to evaluate the Environmental Measurements Laboratory's (EML's) activities relating to the generation and subsequent management of hazardous, low-level radioactive, radioactive mixed, medical, and (non-hazardous) solid wastes. The major statutes and regulations against which EML's waste management performance was evaluated include: the Resource Conservation and Recovery Act (RCRA), the Hazardous and Solid Waste Amendments (HSWA), Environmental Protection Agency (EPA) Hazardous Waste Regulations and Guidance, EPA Medical Waste Regulations, New York State statutes and regulations regarding hazardous and solid and medical waste management, and DOE Orders. A complete listing of statutes and regulations appears in Table 3-3.

The scope of the Audit activities included: (1) inspections of laboratories and other facilities where wastes are being generated; (2) inspections of waste accumulation and storage areas; (3) reviews of available written waste management procedures; (4) reviews of waste management records, including shipping documents relating to offsite waste shipments and reports of audits and inspections conducted by outside authorities; (5) reviews of reports of internal waste management auditing efforts; and (6) interviews with EML personnel responsible for waste management. Both EML's New York City location and the Remote Field Sampling Site in Chester, New Jersey were evaluated. However, the amounts of all categories of wastes generated at Chester are extremely low or non-existent. Consequently, the evaluation relates entirely to the New York City facility. Certain special wastes are generated at the New York City facility as a result of infrastructure maintenance and modification. Most notable among these wastes are asbestos wastes resulting from the removal of asbestos-containing insulating materials. However, such infrastructure activities are the responsibilities of the General Services Administration (GSA) and consequently, were not evaluated in this Audit.

Solid wastes are generated from a variety of administrative and technical functions. Office paper wastes represent the majority of the solid waste stream. However, empty containers and packaging materials, as well as general trash and some non-salvageable materials from laboratories and shops also contribute to the solid waste stream. Solid wastes from EML are collected on a daily basis by personnel from the GSA, combined with solid wastes from other building occupants, and transported by appropriately licensed haulers to permitted solid waste disposal facilities. EML has no responsibilities regarding solid waste collection, transportation, or disposal activities, although EML does participate in a paper recycling program.

Hazardous wastes are generated as a result of a variety of analytical functions at EML. These wastes include spent cleaning solutions, spent solvents, and various waste solutions that exhibit hazardous characteristics (toxicity, as determined by the RCRA Toxic Characteristic Leaching Procedures (TCLP) characteristics, or corrosivity). Hazardous wastes may also result from the operation of various support facilities such as the machine shop, the photographic processing laboratory, and printed circuit board etching facility. Finally, hazardous wastes may result from the disposal of off-specification chemicals or chemicals whose useful shelf lives have expired. EML is a conditionally exempt, small quantity generator, routinely generating less than 100 kilograms (220 pounds) per calendar

Table 3-3

List of Waste Management Regulations, Requirements, and Guidelines

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
DOE 5400.1	General Environmental Protection Program	DOE
DOE 5400.3	Hazardous and Radioactive Mixed Waste Program	DOE
DOE 5480.4	Environmental Protection, Safety, and Health Protection Standards	DOE
DOE 5480.19	Conduct of Operations for DOE Facilities	DOE
DOE 5482.1B	Environment, Safety and Health Appraisal Program	DOE
DOE 5820.2A	Radioactive Waste Management	DOE
DOE 6430.1A	General Design Criteria	DOE
DOE Memorandum	Solvent Contaminated Rags and Wipers (Draft), Oct. 1990 from Ray Berube	DOE
Implementation Guidance	Implementation Guidance for DOE 5400.1	DOE
Implementation Guidance	Implementation Guidance for DOE 5820.2A	DOE
40 CFR 259	Standards for the Tracking and Management of Medical Waste	EPA
40 CFR 260 through 280	Hazardous Waste Regulations	EPA
NYCRR* Title 6, Ch. 360	Solid Waste Management Facility Rules	NYSDEC**
NYCRR Title 6, Ch. 364-9	Medical Waste Regulations	NYSDEC
NYCRR Title 6, Ch. 370	General Hazardous Waste Management System Regulations	NYSDEC
NYCRR Title 6, Ch. 371	Identification and Listing of Hazardous Waste Regulations	NYSDEC
NYCRR Title 6, Ch. 372	Hazardous Waste Manifest System Regulations	NYSDEC
NYCRR Title 6, Ch. 373-1	Hazardous Waste Treatment, Storage, and Disposal Facility Permitting Requirements	NYSDEC
NYCRR Title 6, Ch. 373-3	Interim Status Standards for Owners and Operators of Hazardous Waste Facilities	NYSDEC
NY Environmental Conservation Law, Article 27	Collection, Treatment and Disposal of Refuse and Other Solid Waste	NYAC

*New York Compilation of Rules and Regulations

**New York Department of Environmental Conservation month (see 40 CFR 265). As a result, many of the hazardous waste regulations (40 CFR 260-268) do not strictly apply to EML. However, EML must still comply with the provisions of 40 CFR 262.11, *Hazardous Waste Determination*, and 40 CFR 261.5, *Special Requirements for Hazardous Waste Generated by Conditionally Exempt Small Generators*, utilize licensed hazardous waste transporters, and ensure that its hazardous wastes that are not treated onsite are delivered to permitted treatment, storage, or disposal facilities (TSDFs).

Listed hazardous wastes are generated in numerous laboratories and support facilities throughout EML. The EML personnel who generate such wastes are responsible for their proper characterization and proper management in accumulation areas, which are normally located immediate to the area in which the waste was generated. Hazardous waste determinations are normally based on process knowledge. Hazardous wastes are routinely stored in containers of 1-gallon size or smaller. The wastes are ultimately transferred by the generator from their waste accumulation areas to the central hazardous waste storage area in the Central Storeroom (Room 535), but are not repackaged. Wastes are removed from the waste storage facility on a periodic, as needed, basis (average two times per year) by registered hazardous wastes transporters for storage, treatment, or disposal at a RCRA-permitted facility. The wastes are repackaged into "lab packs" by the transporter before shipment. A hazardous waste inventory log is maintained by the storeroom clerk for hazardous wastes in the central storage facility. Manifest records of offsite shipments are also maintained by the Distribution Facility Supervisor (DFS). No irregularities in hazardous waste shipments have occurred.

EML's recently adopted hazardous waste management procedure also provides guidance to individual generators for the treatment and disposal of certain hazardous wastes. Disposal often involves discharge of treatment residues to the sanitary sewer. No records are kept regarding the amounts of hazardous wastes managed in this manner.

EML's hazardous waste management activities have been inspected by two outside authorities (prior to this Audit). Representatives of EPA Region II conducted a RCRA inspection in July 1990. The EPA inspector verbally indicated that no major violations were discovered. However, a written report was not provided, despite EML's request. Personnel from the Environmental Protection Branch of the DOE Field Office, Chicago (DOE-CH) conducted an inspection of all EML waste activities in October 1990. A list of "Agreements and Commitments" was negotiated between EML and DOE-CH, specifying actions and changes intended to address noted deficiencies. EML has completed some of the indicated changes to DOE-CH's satisfaction, while some are still outstanding.

Low-level radioactive waste results from certain analytical procedures involving radioactive tracers and standards. The low-level radioactive waste stream is small and consists mainly of discarded gloves, wipes, absorbent laboratory bench covers, and equipment that cannot be easily decontaminated. Low-level radioactive wastes are stored in a locked vault basement storage area, under the control of EML's Radiation Safety Officer, who is ultimately responsible for arranging for offsite disposal of the wastes. EML is attempting to establish an arrangement with Brookhaven National Laboratory (BNL) for offsite disposal of its low-level radioactive wastes. When appropriate, low-level radioactive wastes are stored to allow for natural decay of the contained radionuclides to *de minimus* levels (> 10 half lives), after which the remainder is disposed of as non-radioactive solid waste. Finally, the Radiation Safety Officer is currently involved in the cleanup of the aerosol research laboratory which is located adjacent to the storage area. That cleanup activity is expected to generate additional amounts of low-level radioactive wastes.

The volume of radioactive mixed waste generated at EML is routinely very small. Radioactive mixed wastes result primarily from the discarding of radioactive solutions used for instrument calibrations which also contain RCRA listed hazardous constituents, including such organic compounds as xylene. Radioactive mixed wastes are stored in the basement storage area controlled by the Radiation Safety Officer, who is also responsible for their eventual offsite disposal. No shipment of radioactive mixed waste from EML has occurred for over fifteen years. Two shipments of radioactive waste from EML have occurred to date. A third shipment is currently being prepared. This shipment will consist of a contaminated piece of concrete, 1.5 feet^3 in volume and other miscellaneous waste totalling 2 feet^3 in volume. The concrete is a unique waste, not expected to be generated again. The remaining amounts of waste represent approximately 15 years of generation.

Potentially infectious medical waste is generated as a result of the continuing program at EML to measure strontium in human bone tissue. The medical wastes are generated in Room 541. The waste stream consists of gloves, face masks, contaminated wipes, and absorbent laboratory bench covers resulting from the preparation of bone samples for ashing. The containers in which the bone samples were shipped to EML are also included. Ashing occurs twice per year. Medical wastes are stored in the sample preparation laboratory and shipped to offsite disposal facilities, generally twice per year.

In general, EML's waste management activities are satisfactory. However, some administrative and procedural deficiencies have been noted. Although these deficiencies, in and of themselves, do not constitute a significant threat to human health or the environment, they can erode EML's ability to demonstrate compliance with applicable standards. The hazardous waste management procedures that were recently put into effect do not provide sufficient guidance to generators of hazardous wastes to ensure proper hazardous waste management in all instances. Those aspects of the procedures relating to management of the central hazardous waste storage facility are also ambiguous in some aspects. These ambiguities may result in the mislabeling (and subsequent mismanagement) of hazardous wastes. Low-level radioactive wastes, radioactive mixed wastes, and radioisotope standards, which are awaiting return to suppliers, are not properly labeled and segregated in their collective storage location. This may result in cross-contamination and increased cost and complexity associated with the ultimate disposition of these materials. Finally, it is important to note that the small volumes of all types of waste generated at EML, significantly reduce the actual or anticipated risks to EML personnel, the public, or the environment.

There are three compliance findings in the Waste Management section, one relating to radioactive waste management, and two relating to hazardous waste determinations and waste management procedures. There are two best management practice findings, one relating to procedures for hazardous waste management, and one addressing medical waste management. No deficiencies were noted for solid waste management.

3.3.2 Findings

WM/CF-1: Hazardous Waste Determinations

Performance Objective: DOE 5400.1, *General Environmental Protection Program*, establishes the DOE policy that all operations will be conducted in an environmentally safe and sound manner, consistent with both the letter and spirit of applicable statutes and regulations. DOE 5400.3, *Hazardous and Radioactive Mixed Waste Program*, provides specific directives requiring compliance with requirements for hazardous waste management contained in Subtitle C of the Resource Conservation and Recovery Act (RCRA), including compliance with federal regulations promulgated under that authority.

The Environmental Measurements Laboratory's (EML's) *Procedures for the Accumulation, Storage and Disposal of Hazardous Waste* (D-WM-2) requires generators to complete hazardous waste determinations and properly label hazardous wastes before they are placed into waste accumulation areas. The procedure requires the container labels to be marked with the words "Hazardous Waste," and to contain additional information about the waste's hazardous nature or exact chemical constituency. The EML procedure further prohibits the receipt of improperly labeled containers of hazardous wastes into the central hazardous waste storage area.

Finding: Hazardous waste stored in a laboratory waste accumulation area and hazardous wastes stored in the central storage area are not properly characterized in accordance with 40 CFR 262.11.

Discussion: As a conditionally exempt small quantity generator (40 CFR 261.5), EML is relieved of many of the hazardous waste generator requirements of 40 CFR 262. However, regardless of its conditionally exempt small quantity generator status, EML is responsible for always complying with the provisions of 40 CFR 262.11, *Hazardous Waste Determination*. EML's internal procedures for hazardous waste management place the responsibility for proper hazardous waste determinations and proper container labeling on the individual generators (D-WM-4). Correct hazardous waste designations and labeling are fundamental to proper management. Such determinations and labeling must, therefore, occur at the time the waste is initially generated and before it is placed into waste accumulation or central storage areas. Also, in most instances, generators rely on process knowledge to make hazardous waste designations, adding additional importance to making hazardous waste interpretations promptly.

One instance was observed of hazardous waste being stored in a laboratory waste accumulation area without proper or sufficient labeling. The label, "Solvent Wastes," did not distinguish the material as a hazardous waste, and did not convey information on the hazard or chemical constituency of the material, as required by the EML procedures. Improperly labeled hazardous wastes were also found stored in the central storage area in violation of EML's hazardous waste management procedures. The improper labels included one reading "Solvent Waste," and a second reading "Etching Solution (Used)."

Failure by the generator to convey information on the nature of the hazard or the chemical constituency compromises EML's ability to effect safe management of the waste and may preclude the expeditious disposal of the waste.

The apparent causal factors for this finding are inadequate supervision of site procedures and inadequate training of personnel responsible for implementation of site policies and guaranteeing compliance with Federal requirements relative to hazardous waste management.

WM/CF-2: Adherence to Internal Hazardous Waste Management Procedures

Performance Objective: DOE 5400.3, *Hazardous and Radioactive Mixed Waste Program*, requires the Environmental Measurements Laboratory (EML) to develop and implement a program to assure that hazardous wastes are managed in accordance with Resource Conservation and Recovery Act (RCRA) requirements. Federal hazardous waste regulations in 40 CFR 261.5 require conditionally exempt small quantity generators to determine the correct designation for their hazardous wastes, and maintain adequate records of waste generation, onsite storage, and transportation to RCRA treatment, storage, or disposal facilities (TSDFs). EML's *Procedures For The Accumulation, Storage and Disposal of Hazardous Waste* (D-WM-4) assigns responsibilities and provides direction and guidance on hazardous waste management at EML.

Finding: Nonconformances with EML hazardous waste management procedures were observed in one hazardous waste accumulation area, and in the central hazardous waste storage area.

Discussion: The following specific nonconformances with the EML hazardous waste management procedures were observed:

- Waste containers in accumulation areas have not met the minimum labeling requirements of Item II(A)(1).

- Waste containers have been received into the storage area without proper labeling required by Item II(B)(3).

- Waste containers are present in the storage area that have not been assigned the required sequential inventory number (which correlates each container to the Hazardous Waste Log), as required by Item II(B)(3). (EML personnel corrected this deficiency immediately.)

- Containers of hazardous wastes are being stored on the loading dock, an area not sufficiently secured so as to prevent damage to the waste containers, as required in Item II(A)(2).

- Records being kept in association with the Hazardous Waste Inventory have not been arranged or filed in such a way so as to relate them exclusively to one particular waste container. (During the inspection, EML officials attempted to resolve the labeling deficiencies of a container labeled only as "Solvent Wastes." Although there was a note to the storeroom attendant from a researcher indicating the chemical constituency of a waste container, this note could not be immediately or exclusively associated with the improperly labeled waste container in question (see Finding WM/CF-1).)

- The maximum storage of waste in the central storage area is limited to 100 kilograms (220 pounds) as per Item II(B)(1)(a). Waste circuit board etching solution and photographic processing solutions, resulting from recent laboratory cleanup efforts, have been received into the central waste storage area without their weights being established. The introduction of these wastes may, therefore, have resulted in an exceedance of the self-imposed weight limit for the central storage area.

The violations noted above are largely administrative in nature. With the possible exception of the storage of wastes on the loading dock, these violations do not automatically or necessarily constitute an unreasonable threat to human health or the environment. However, improperly or incompletely labeled containers of hazardous waste do represent unknown risk to the safety and health of individuals managing those wastes, and compromise the credibility and effectiveness of the entire waste management effort at EML.

It is also important to note that as a result of its recent cleanup efforts, EML may have generated greater than 100 kilograms of waste in one calendar month, thus causing it to lose its small quantity exemption for that period.

The apparent causal factors for this finding include inadequate supervision, inadequate training of personnel in positions critical to the proper implementation of site policy, and incomplete procedures for operation of the central waste storage area.

WM/CF-3: Radioactive Waste Management Program

Performance Objective: DOE 5820.2A, *Radioactive Waste Management*, Chapter III, Paragraph 2.a., requires that waste operations be managed to preserve the environment of the waste management facility. Chapter III, Paragraph 3.c.4., requires that a generator preparing a design for a new process or process change shall incorporate principles into the design that will minimize the generation of waste. Chapter III, Paragraph 3.h., requires that records be maintained for all low-level wastes (LLW) that enter and leave the storage facility. Paragraph 3.m. requires, in part, development of a recordkeeping system that provides an historical record of the waste generated, treated, and stored at the waste facility. Chapter III, Paragraph 3.l., requires that radioactive waste operations be consistent with DOE 5700.6B, *Quality Assurance*, superseded by DOE 5700.6C, which outlines requirements for quality assurance including written quality assurance programs and specific written procedures.

Finding: Environmental Measurements Laboratory (EML) does not have a formalized program to manage radioactive wastes.

Discussion: EML does not have a formalized radioactive waste management program which includes procedures that will guarantee appropriate and consistent management of radioactive wastes and includes a waste minimization program. The current EML basement waste storage facility is not managed in a manner such that the identity and quantity of the waste, its storage location, date of storage, and any pertinent exposure rate information are readily available. Although many of the waste packages are labeled with important information, often complete information is lacking. In addition, there are other waste packages which are not labeled adequately enough to permit any sort of waste identification. All procedures regarding management of radioactive wastes must include quality assurance requirements.

During the last few months, EML staff have made some initial efforts to perform an inventory of waste material in storage. However, the inventory is not complete. One area of concern is that there are ^{226}Ra solutions stored as waste in gas-washing bottles, with both the inlet and outlet vents pinched off with rubber hoses and clamps. These containers are stored in an inactive aerosol research laboratory adjacent to the basement waste storage facility. Some of the hose appears to be deteriorating with age and there may be some leakage of ^{222}Rn into the waste facility room. Since no radon monitoring has been performed there in the recent past, the status of the problem is unknown.

The apparent causal factors for this finding are inadequate policy implementation of DOE Orders and inadequate internal audits/appraisals/reviews to identify deficiencies with the system.

WM/BMPF-1: EML Hazardous Waste Management Procedures

Performance Objective: DOE 5400.3, *Hazardous and Radioactive Mixed Waste Program*, requires the Environmental Measurements Laboratory (EML) to develop and implement a program to assure that hazardous wastes are properly managed. Federal regulations promulgated in 40 CFR 261.5 define conditionally exempt small quantity generators and establish waste management objectives for this category of hazardous waste generators. Best management practice requires EML to maintain records sufficient to demonstrate the proper management of their wastes, as well as their continuing qualifications for small quantity generator exemptions.

Finding: EML's *Procedures For The Accumulation, Storage and Disposal of Hazardous Waste* (D-WM-4) is deficient in a number of areas and insufficient in scope to prevent inadvertent mismanagement of hazardous waste. The procedures also do not specifically require waste management personnel to periodically confirm EML's conditionally exempt status.

Discussion: In November 1990, representatives of the DOE Field Office, Chicago's (DOE-CH's) Environmental Protection Branch conducted an Environmental Protection Appraisal of EML's New York City facility (D-WM-2). A number of deficiencies were noted in the area of hazardous waste management. A series of Agreements and Commitments were negotiated between EML and DOE-CH to address noted deficiencies. These Agreements and Commitments appeared in Appendix D of DOE-CH's *Environmental Protection Appraisal Report*. In particular, EML agreed to: "Provide a comprehensive Laboratory-wide procedure for managing hazardous wastes by March 1, 1991."

In response to its commitment to DOE-CH, EML has drafted a *"Procedures for the Accumulation, Storage, and Disposal of Hazardous Waste"* (D-WM-4). DOE-CH has provided review comments to EML on both an initial and a final draft version of the waste management guidance. Although DOE-CH's comments on the final draft were only recently provided to the site (December 5, 1991) (D-WM-13), EML put its final hazardous waste management procedure in place in October 1991 (I-WM-6 and I-WM-7). The Audit Team's review of the EML waste management procedures that are now in effect forms the basis of this finding.

While it is beyond the scope of this Audit to provide a comprehensive analysis of EML's hazardous waste management procedures, the following evaluation is offered. However, the comments below are not intended to contravene any review comments provided to EML by DOE-CH, or to relieve EML from its responsibility to consider DOE-CH comments in revisions or expansions of its procedures. Instead, these comments should be read in conjunction with those DOE-CH comments. None of the evaluation comments appearing below is believed by the Audit Team to be mutually exclusive with any DOE-CH comment received to date by EML.

- **Instructions provided for allowable discharges to the sink are incomplete and non-specific.** The use of such words and phrases as "small quantities," "copious amounts," "low toxicity," and "harmless organics" introduces considerable ambiguity into these instructions, and leaves them open to unique interpretations by each potential hazardous waste generator. These instructions, therefore, offer no guarantee of consistent decisions regarding acceptable discharges of hazardous wastes to the sinks.

- **There is no discussion in the procedures regarding spill debris.** Instructions to potential generators do not include directions to consider the potential applicability of Resource Conservation and Recovery Act (RCRA) regulations to the management of residues and other debris resulting from the cleanup of RCRA listed chemicals as per 40 CFR 261.33.

- **The procedures contain ambiguous directions with respect to the assignment of sequential inventory numbers to containers as they are received into the central hazardous waste storage facility.** The storeroom clerk is not interpreting the sequential inventory numbering system as intended (I-WM-11). As a result, there are presently two separate cases where two containers in the central waste storage facility have the same inventory number. The duplication results from the storeroom attendant beginning a new inventory sequence for each new grouping of wastes that will eventually constitute one offsite shipment. However, the procedure's author intended for the inventory numbering to be fully sequential over time (I-WM-5), transcending individual shipment groupings.

- **The procedures are not sensitive to the possibility that the waste transporter need not be affiliated with the Treatment, Storage, and Disposal Facility (TSDF) to which EML's waste is eventually sent.** It is not clear in the procedures that the effort to verify "the contractor's" good standing may require verification of a RCRA transporter's status, as well as verification of the TSDF's status. The directive is also presumptive that the TSDF receiving EML's waste will be located in New York. Interstate shipments may require EML to undertake additional verification efforts. Also, there is no specific procedure for documenting the results of those verification efforts.

- **It is not clear in the procedures that discarded chemical products may also need to be managed as hazardous wastes if they appear as "U" or "P" listed wastes in 40 CFR 261.33.** There are no directives to waste generators to consult RCRA Hazardous Waste listing in selecting options for disposal of discarded chemical products.

- **The procedures are silent on such management and design elements as contingency and emergency planning, routine inspections, and operator training.** Generator requirements in 40 CFR 262 and facility design and operating requirements in 40 CFR 265 provide potentially appropriate guidance on the safe management of hazardous wastes by conditionally exempting small quantity generators. However, EML officials do, in fact, recognize that training is essential (I-WM-5, I-WM-10, and I-WM-11). In response to the DOE-CH appraisal, EML has committed to providing hazardous waste training for the storeroom manager, although formal training has not yet been completed.

- **There are no specific provisions for oversight of the implementation of hazardous waste management procedures by the EML Environmental Protection Officer.** As a consequence, misinterpretation of procedural requirements may go unnoticed for indefinite periods of time. Consistent interpretations of procedural requirements and conformance with waste management procedures by various generators also cannot be confirmed.

- **There is no formal commitment to periodic revisions of the procedures.** EML officials clearly recognize the need to periodically revise their waste management procedures (I-WM-6 and I-WM-10) and have indicated that they expect to perform such revisions on an annual basis (I-WM-6), but there is no written commitment to such revisions. Besides such periodic, planned revisions, the procedure offers no mechanism for immediate resolution of problems, clarifications of procedural requirements, or response to new requirements in federal regulations or DOE Orders.

- **The procedures do not address empty container disposal.** The procedure does not provide specific directives regarding the disposal of chemical containers (or liners from containers) that once held chemicals appearing on the "P" or "U" lists of 40 CFR 261.33. The procedure also appears to be insensitive to the definition of "empty container" provided in 40 CFR 261.7(b) as it might apply to the disposal of "P" or "U"-listed chemical containers.

The apparent causal factors for this finding are inadequate policy implementation of statutory and regulatory waste management requirements, incomplete procedures, and inadequate training for key individuals.

WM/BMPF-2: **Medical Waste**

Performance Objective: DOE 5400.1, *General Environmental Protection Program*, requires that DOE facilities be operated in a manner that is safe and protective of the environment, and in conformance with Federal statutory and regulatory requirements. Federal regulations promulgated by the Environmental Protection Agency (EPA) in 40 CFR 259 establish standards applicable to generators of regulated medical wastes located in specified covered states, including New York. Regulations promulgated by the New York Department of Environmental Conservation appear in Title 6, NYCRR 364.9.

Finding: The Environmental Measurements Laboratory (EML) has not taken the steps necessary to determine the current (state) regulatory envelope for medical waste management, and is unaware of the specific state requirements that apply to management of their medical wastes (I-WM-12). Written medical waste management procedures do not sufficiently address all administrative requirements.

Discussion: The Medical Waste Tracking Act of 1988 authorized EPA to promulgate regulations for the administrative management of certain medical wastes. These regulations were intended to allow EPA to collect the necessary data to determine the appropriate level of control for potentially infectious medical wastes. A number of states, including New York were offered the opportunity to participate in EPA's evaluation program. New York elected to participate, and promulgated regulations under Title 15, Article 27 of New York's Environmental Conservation Law (Title 6, NYCRR 364.9). The effective dates of the Federal regulations were June 22, 1989 to June 22, 1991. New York's regulations, however, have not expired and continue in effect (I-WM-4 and I-WM-13).

EML generates small volumes of regulated medical wastes as a result of its continuing program of radiation fallout monitoring, one portion of which involves the analysis of human bone tissue. EML's management of medical wastes are substantively in compliance with Federal regulations promulgated by EPA in 40 CFR 259 for generators of regulated medical wastes. However, EML has not determined whether additional or different requirements have been established in New York State Department of Environmental Conservation (NYSDEC) regulations and is unaware of the specific requirements of the state program that may apply to EML's medical waste management.

The state regulations, promulgated in 6 NYCRR 364.9 are administered by the NYSDEC. NYSDEC officials have indicated (I-WM-4 and I-WM-13) that although these requirements were initially derived from the Federal regulations under 40 CFR 259, the state regulations are more restrictive with respect to small quantity generator exemptions provided under 40 CFR 259.51. State regulations are also broader in scope than their Federal counterparts in imposing certain secondary shipping container requirements for the transport of "sharps."

EML has developed written procedures for human bone tissue sample preparation (I-WM-12; D-WM-12). However, these procedures are incomplete for the management of the resulting medical wastes. Specifically, procedures for packaging, labeling, storage, and ultimate disposal of medical wastes are not addressed in the procedure. Administrative requirements, such as recordkeeping and exception reporting, also are not addressed in the procedures. However, EML has substantively complied with the state requirements and contracts for offsite disposal of its wastes with transporters who have assured conformance with state requirements, including the use of a state approved *Medical Waste Manifest* (D-WM-5).

The apparent causal factors for this finding are inadequate policy implementation and procedure development with respect to state regulations.

3.4 Toxic and Chemical Materials

3.4.1 Overview

The purpose of the Toxic and Chemical Materials portion of the assessment was to evaluate the procedures for procurement, storage, and control of chemicals at the Environmental Measurements Laboratory (EML). The specific regulations, requirements, and guidelines used to evaluate EML during this assessment are shown in Table 3-4.

The scope of this assessment included a review of the EML protocol for the procurement, handling, and storage of chemicals; interviews with EML administrative personnel who have responsibility for ordering chemicals, storeroom personnel who control the storage and dispensing of stock chemicals, and supervisors who oversee the storage and use of chemicals in individual laboratories; and a walkthrough of selected laboratories, instrument shops, and the materials storeroom to observe how chemicals are stored and labeled. The assessment also included a review of the availability and procurement of Material Safety Data Sheets (MSDSs) for the chemicals used at EML.

At EML, the focus of the Toxic and Chemical Materials assessment was the storage and use of laboratory and shop chemicals. There were no polychlorinated biphenyl (PCB)-containing transformers or capacitors at the facility. All fluorescent light fixtures were replaced within the past several years, and the servicing of the lights and associated light ballasts is done by the General Services Administration (GSA). Thus, there are no PCB materials disposal issues at EML. Likewise, since the maintenance of EML facilities is also done by GSA, the EML does not have responsibility for the disposal of asbestos wastes generated during facility renovation activities. Due to the location of EML as a tenant within a building, EML does not have any land application of pesticides.

Chemicals used in EML laboratories are procured in one of two ways; basic stock chemicals such as nitric, hydrochloric and sulfuric acids, and organic solvents like alcohols, hexane and methylene chloride are ordered by the administrative personnel at the storeroom. These commonly used chemicals are stored and dispensed from the storeroom upon request of the individual research laboratory. When the on-hand quantities of the stock chemicals fall below a certain amount, the storeroom personnel have responsibility to order more chemicals. When an individual researcher requires a chemical not routinely stocked, the researcher must order the chemical through the administrative branch with the approval of the appropriate division director. The chemical would then be shipped to the storeroom and dispensed directly to the specific laboratory. The storeroom does not accumulate these special-order chemicals. The procurement of chemicals is done via a computerized system which tracks whether or not a chemical may be hazardous, and if EML has an MSDS for that substance.

The storeroom stocks mineral acids in 1-gallon size containers as packaged by the supplier. These are kept on pallets and dispensed as needed to the individual laboratories. There are approximately 250 gallons of mineral acids in the stockroom. Organic solvents, including flammable and chlorinated solvents, are kept in up to 1-gallon bottles within double-contained, vented, and locked metal cabinets. The total quantity of organic solvent stored in these cabinets is less than 50 gallons. Access to these are controlled by designated stockroom persons. The chemical storage areas are clean, well-ordered, and contained proper warning labels with clearly posted hazardous material safety data. There

Table 3-4

List of Toxic and Chemical Materials Regulations, Requirements, and Guidelines

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
DOE 5400.1	General Environmental Protection Program	DOE
40 CFR 1910	Hazardous Materials Storage	OSHA

are no floor drains in the storeroom area; material spills would be contained by application of absorbent materials kept in the storage area.

Chemical storage within individual laboratories at EML is done according to accepted standard laboratory practice. Most of the chemicals are kept in laboratory workbenches or in labeled cabinets. Suspected carcinogens are kept in labeled, dedicated refrigerators within one instrumental laboratory. MSDSs are stored in an open-access central location within the Analytical Chemistry Division.

Overall, the management of chemicals at EML appears to be adequate. Storeroom and laboratory personnel have some knowledge of emergency response procedures for hazardous chemical release; however, there are no formal procedures for spill response and little formal documentation of their training in this area. The potential for release of toxic or hazardous chemicals to the environment, or building areas outside EML is small.

There is one compliance and one best management practice finding in the Toxic and Chemical Materials section of this Audit, which relate to the lack of a Pollution Prevention Awareness Program and inadequate procedures for assuring that MSDSs for all chemicals used at EML are available onsite, respectively.

3.4.2 Findings

TCM/CF-1: Pollution Prevention Awareness Program

Performance Objective: DOE 5400.1, Chapter III, Section 4, *General Environmental Protection Program*, requires that a documented Pollution Prevention Awareness Program (PPAP) Plan be prepared that includes elements for employment awareness through specific training, special awareness campaigns, and incentives and award programs. DOE 5400.1 requires the PPAP be implemented by November 1989.

Finding: The Environmental Measurements Laboratory (EML) has not developed or implemented a PPAP in accordance with DOE 5400.1, Chapter III.

Discussion: EML does not have a PPAP that meets the requirements of DOE 5400.1. A PPAP is briefly described in the *Environmental Protection Implementation Plan* (EPIP) (D-TCM-2), which states that an awareness of pollution prevention is an indigenous component of that research; each staff member is issued a copy of the EPIP and DOE Field Office, Chicago (DOE-CH) Environmental Policy statement and updates; and that the annual environmental briefing, planned for February 1991, is an important component of the PPAP.

These activities do not constitute a comprehensive PPAP. In addition, the planned annual environmental briefing did not take place and, due to staffing changes, is currently not under development (I-TCM-16 and I-TCM-17).

The apparent causal factor of this finding is lack of policy implementation of DOE 5400.1.

TCM/BMPF-1: Material Safety Data Sheets for Chemicals

Performance Objective: Material Safety Data Sheets (MSDSs) should be available onsite for all chemical substances used at the facility. In order to assure that there is an MSDS for each chemical substance, it is a best management practice to have an effective method for obtaining an MSDS for all chemicals procured and delivered to the facility.

Finding: The Environmental Measurements Laboratory's (EML's) automated chemical procurement system does not ensure that an MSDS is available for all chemicals ordered.

Discussion: MSDSs are intended to provide important data about the physical, health, and environmental hazards associated with a particular product or chemical substance. The U.S. Occupational Safety and Health Administration (OSHA) developed criteria for the data required on an MSDS, and requires that the chemical product manufacturer develop and make available the proper MSDS for each chemical distributed to a user. In turn, the chemical user should provide access to the MSDS for those who may have contact with the chemical. The requirement to develop and provide an MSDS is independent of the actual hazardous characteristics of the substance.

An outside vendor supplies EML with an extensive file of MSDSs of chemicals which is maintained in a hardcopy file in the Analytical Chemistry Division. The existing MSDS file at EML is only available as hardcopy, it is not stored on an electronic data system.

When a new chemical, which has no MSDS on file at the laboratory, is requisitioned for purchase, the strategy to obtain the appropriate MSDS is dependent upon a pre-determination that the compound is hazardous by the initiator of the purchase order. The automated purchasing system will prompt the person requesting the chemical to determine if the substance is hazardous during the initial stage of the requisition process. If the requisition form notes that the chemical is a hazardous material, the purchasing agent will request an MSDS along with shipment of the chemical. If the requisition form notes that a chemical is non-hazardous, MSDSs is not requested as part of the shipment. The procurement system will not automatically request confirmation that MSDSs for all substances are on file at EML.

There are no written guidelines on the criteria to be used in making the preliminary assessment that a substance is hazardous; consequently, a substance might be ordered without the needed MSDS in the shipment. This scenario is unlikely since the initial requisition always would be reviewed by a chemist, who would know the characteristics of the substance (I-TCM-13). However, the reliance on personal competence should not obviate the existence of defined, written procedures to obtain an MSDS for all chemicals utilized at the facility. In addition, MSDSs should be obtained and kept on file for all substances, not merely those deemed hazardous by some as-yet undefined criteria.

The apparent causal factor for this finding is a failure to adequately implement procedures to ensure that MSDSs are requested and maintained for all chemicals used at the facility.

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3.5 Quality Assurance

3.5.1 Overview

The purpose of the Quality Assurance portion of the Environmental Audit was to evaluate the quality assurance for the Environmental Measurements Laboratory's (EML's) environmental protection program. The environmental protection programs were reviewed for compliance with DOE Orders, regulatory agency quality assurance requirements, and best management practices. Regulations, requirements, and guidelines are listed in Table 3-5.

The scope of the assessment included discussions and interviews with EML personnel and a review of the documents listed in Appendix D. As part of the Quality Assurance assessment, reviews were coordinated with other team specialists to ensure that all potential environmental quality assurance issues were evaluated. The Air, Radiation, and Surface Water specialists were consulted with regard to their emission/effluent monitoring investigations.

At present, EML is not conducting any environmental monitoring or surveillance activities, hence no quality assurance plan is required for those activities. EML does generate radioactive wastes, but does not have the appropriate quality assurance plan, as required by the DOE's *Radioactive Waste Management Order*, for its radioactive waste management operations (see Finding WM/CF-3). The current *EML Institutional Quality Assurance Plan* is designed to provide quality assurance guidance solely for research efforts. This document contains no quality assurance for Environmental Monitoring and Surveillance. Quality assurance regarding document control is covered in the management section (see Finding EM/CF-2).

Table 3-5

List of Quality Assurance Regulations, Requirements, and Guidelines

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
DOE 5700.6C	Quality Assurance	DOE
DOE 5820.2A	Radiological Waste	DOE
NQA-1	Quality Assurance Program Requirements for Nuclear Facilities	ASME

3.6 Radiation

3.6.1 Overview

The purpose of the Radiation portion of the Environmental Audit was to evaluate the environmental radiation protection program at the Environmental Measurements Laboratory (EML) with respect to Federal and state regulations, DOE Orders, and EML policies and procedures. The program was also evaluated against commonly accepted practices and standards of performance.

The major statutes and regulations against which EML's environmental radiation protection performance was evaluated include: the National Emission Standards for Hazardous Air Pollutants (NESHAP); DOE 5400.5, *Radiation Protection of the Public and the Environment*, and DOE 5820.2A, *Radioactive Waste Management*. A complete listing can be found in Table 3-6. The approach to environmental radiation protection review included interviews with EML site personnel; field observations of operations and practices; and a review of documents, procedures, and records associated with the environmental radiation protection program.

The scope of the environmental radiation protection review was focused on five principal areas: identification and assessment of sources of radioactive emissions from EML; issues related to the management of radioactive waste; procedures related to the survey and release of property potentially contaminated with radioactive material; method review of radiological measurements and analyses; and nuclear source inventory and control documentation. The review was conducted to evaluate how EML assesses, in quantitative terms, the potential release of radioactive material to the environment.

In carrying out its research, EML's inventories and routine uses of radioactive materials reflect those of a low-level environmental research laboratory. The isotope preparation room has been identified by EML as an area which has the greatest potential for the generation of radioactive material that could be released to the environment either via the sanitary sewer system or the building exhaust ventilation system. Work in the isotope preparation room involves handling up to 5 milli-curies (mCi) of various radionuclides, in aqueous form, for the purpose of preparing reference standards for the calibration of analytical equipment.

Over the past year, air samples have been collected and analyzed from the isotope preparation room during the preparation of reference samples, which indicated that no airborne radioactivity was generated during sample preparation. EML management has verbally indicated they plan to continue to sample the air in the isotope preparation room whenever reference samples are being prepared to further demonstrate that no airborne radioactivity is generated and released to the environment.

There is currently no monitoring of EML's liquid effluents which contain trace levels of radioactivity, and there is no formalized method to estimate the actual magnitude of such discharges. In general, researchers working with radioactive material dispose of small quantities of radioactive waste down sink drains, often as rinsate from cleaning laboratory glassware and equipment. All of the unused or discarded reference solutions are packaged and disposed of as radioactive waste. Radioactive material which is short-lived is stored

Table 3-6

List of Radiation Regulations, Requirements, and Guidelines

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
DOE 5400.1	General Environmental Protection Program	DOE
DOE 5400.5	Radiation Protection of the Public and the Environment	DOE
DOE 5820.2A	Radioactive Waste Management	DOE
Interim Guidance (March 8, 1991)	DOE Guidance on the Procedures in Applying the ALARA Process for Compliance with DOE 5400.5	DOE
40 CFR 61	National Emission Standards for Hazardous Air Pollutants	EPA

to permit the decay of the elements to their stable state before the material is disposed of as waste.

EML has performed preliminary radiological dose assessments from estimated air discharges of radioactive material which were derived from an assumed fractional release of material available in inventory. This information will eventually be used to demonstrate compliance with DOE 5400.5 and the *National Emission Standards for Hazardous Air Pollutants*, 40 CFR 61.

Overall, the EML environmental radiation protection program appears to be satisfactory given the nature of the type of activities which are performed there. EML is in the process of accomplishing the necessary tasks to demonstrate compliance with 40 CFR 61, DOE 5400.5, and DOE 5820.2A.

There are two compliance findings and one best management practice finding related to the EML environmental radiation protection program. The first compliance finding involved the absence of an implemented policy which embodies the principles of maintaining environmental releases of radioactive material "as low as reasonably achievable" (ALARA). The second compliance finding related to the absence of procedural guidance to manage the unconditional release of materials and equipment from EML which have the potential of radioactive contamination. The best management practice finding involved the inability to demonstrate full compliance with the requirements specified in NESHAP.

3.6.2 Findings

RAD/CF-1: Environmental As Low As Reasonably Achievable (ALARA) Program

Performance Objective: DOE 5400.5, *Radiation Protection of the Public and the Environment*, requires the operating organization at each DOE facility where activities routinely involve radiation or radioactive materials, to have a program in which releases of radioactive material to the environment are maintained as low as reasonably achievable (ALARA).

As stated in the *DOE Guidance on the Procedures in Applying the ALARA Process for Compliance with DOE 5400.5*, the ALARA program should include the following components: (1) a policy statement and commitment from management to the ALARA philosophy and process; (2) a designated organizational responsibility, authority, and structure for implementing the ALARA program; (3) a systematic evaluation of the operations at the site to identify those activities which are responsible for the exposures of the public and releases of radioactive material; and (4) a procedure by which the operations or activities will be analyzed to determine whether they are being performed in a manner that will ensure that the radiological impacts are ALARA.

DOE 5400.5, Section 6.b., *Protecting the Environment*, states "In addition to providing protection to members of the public, it is DOE's objective to protect the environment from radioactive contamination to the extent practical." The Order also states in Chapter II, Section 2.b., "Therefore, ... qualitative analyses are acceptable, in most instances, for ALARA judgments especially where potential doses are well below the dose limit. The basis for such judgments should be documented."

Finding: The Environmental Measurements Laboratory (EML) has not fully developed and documented an environmental ALARA program as required by DOE 5400.5.

Discussion: A documented current description of the EML environmental ALARA program, reviewed and approved by the appropriate Program Office, and a statement of commitment to implement the ALARA process has not been completed. Although EML management appears to be supportive of the spirit of ALARA (I-RAD-5), historically, due to the low level quantities of radioactive material processed at EML, a formalized environmental ALARA program has not been a top priority item.

Although it is recognized that the quantities of radioactive material released to the environment from air or liquid waste discharges are quite small, the development of an effective environmental ALARA program also involves evaluation of the various research activities to ensure ALARA consideration in terms of experimental design and minimization of radioactive waste generation (see Finding WM/CF-3). It is extremely important that researchers using radioactive materials evaluate their research activities from an ALARA perspective, to ensure that reasonable efforts are applied to minimize the quantity of radioactive materials which might ultimately be released to the environment.

The apparent causal factor for this finding is inadequate policy implementation of DOE 5400.5.

RAD/CF-2: Procedures for the Survey and Release of Potentially Contaminated Materials and Equipment

Performance Objective: DOE 5400.5, *Radiation Protection of the Public and the Environment*, Chapter II, Part 5.c., states that property which has been potentially contaminated with radioactive material may be released, provided that such property has been surveyed to determine whether both removable and total surface contamination is within the levels given in Figure IV-1 of the Order. Property shall be considered potentially contaminated if it has been used or stored in radiation areas which may have contained unconfined radioactive material during the time of its storage.

Property may be released for unrestricted use only if the criteria and survey techniques cited in DOE 5400.5 are met, including formal adoption of written procedures approved by Environmental Measurements Laboratory (EML) management, which provide the means to demonstrate compliance with the Order.

Finding: EML has not developed written and approved procedures for the survey and release of potentially contaminated materials and equipment.

Discussion: Although offsite contamination is highly unlikely given the small quantities of dispersable radioactive materials associated with EML activities, in order to demonstrate full compliance with DOE 5400.5, Chapter II, Part 5, the EML has not developed a written procedure which provides guidance on the control of material and equipment that will be released from the facility that is potentially radioactively contaminated. The procedure should identify the mechanisms by which material and equipment is controlled, the proper method of surveying, interpretation of results against the release criteria in DOE 5400.5, and proper recordkeeping and quality control procedures.

The apparent causal factors of this finding are inadequate policy implementation of DOE 5400.5, and a lack of written procedures to provide the means to demonstrate compliance with this Order.

RAD/BMPF-1: **Radiological Sampling Program in the Isotope Preparation Room**

Performance Objective: DOE 5400.1, *General Environmental Protection Program*, Chapter IV, Paragraph 5 a.2., states, in part, that effluent monitoring shall be conducted to provide representative measurements of the quantities and concentrations of pollutants in liquid and airborne discharges.

National Emission Standards for Hazardous Air Pollutants (NESHAP), 40 CFR 61, Subpart H Paragraph 61.93(b)(4)(ii), requires that an evaluation be conducted to determine whether each potential release point is subject to the emission measurement requirements of 61.93(b).

Finding: The Environmental Measurements Laboratory (EML) does not have a formally documented, procedurally developed, sampling program for the isotope preparation room which would serve to detect and quantify any release of radioactive material to the environment.

Discussion: Radioactive solutions are handled in the isotope preparation room for the purposes of making-up low activity standards for performing quality control checks on various analytical laboratory equipment. The quantity of radioactive material handled can vary, but is generally less than 5 milli-curies (mCi). To date, very little data has been gathered to provide conclusive evidence relative to whether any radioactive material is being released from this operation. EML has not developed a documented sampling program that addresses: frequency of sampling, design of a system to adequately detect low levels of radioactivity, criteria for selecting sampling locations which might be most indicative of a release of radioactive material, and quality assurance procedures. EML is planning to demonstrate compliance with NESHAP by calculating release rates based on an inventory of radioactive materials, rather than through actual effluent measurements (see Finding A/CF-1).

The apparent causal factor for this finding is a lack of procedures to demonstrate validity of air quality data.

3.7 Inactive Waste Sites

3.7.1 Overview

The purpose of the Inactive Waste Sites portion of the Environmental Audit of Environmental Measurements Laboratory (EML) was to evaluate the compliance status of EML with regard to the following: the statutory and regulatory provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the hazardous material storage reporting requirements of the Superfund Amendments and Reauthorization Act (SARA); the regulatory requirements of Federal, state, and local agencies; and the provisions of DOE Orders and Executive Order 12580 (Superfund Implementation) (see Table 3-7).

The scope of this assessment included inspections of both EML's research facility at 376 Hudson Street, New York, New York, and its Remote Field Sampling Site in Chester, New Jersey; discussions and interviews with EML staff; and reviews of site documents.

CERCLA responsibilities and liabilities would be established on the occasion of a release of CERCLA hazardous substances to the environment from EML facilities, or facilities under EML's jurisdiction or control, when such releases have occurred in the past, or when such releases are imminent. The CERCLA statute and its implementing regulations, the National Oil and Hazardous Substances Contingency Plan (NCP), define "release" as "...any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment..." of CERCLA hazardous substances, but exclude releases that occur within buildings or are expected to remain contained within the building (CERCLA Section 101(22); 40 CFR 300).

The NCP (40 CFR 302) further defines CERCLA hazardous substances and establishes reportable quantities for each substance in the event of accidental release to the environment. Numerous CERCLA hazardous substances are present at EML's New York City facility, and EML's chemical inventory indicates that quantities may be present at or above their respective reportable quantities (e.g., nitric acid). However, there is no documented evidence that CERCLA hazardous substances have been released to the environment from the EML facility in the past. Furthermore, circumstantial factors suggest that accidental releases occurring within the EML facility, are likely to be contained within the building or discharged to the sanitary sewer, but not otherwise released to the environment. CERCLA hazardous substances are discharged in limited quantities to Publicly Owned Treatment Works (POTW) via public or community sewer systems. Although such releases do not constitute a release under CERCLA, they may ultimately result in adverse environmental consequences or be otherwise controlled or regulated (see Finding SW/BMPF-4).

Extremely limited amounts of chemicals are present at the Chester, New Jersey Remote Field Sampling Site, and the potential for a release of CERCLA hazardous substances, as a result of EML activities at the site, is considered to be minimal. Further, as with EML's New York City location, there is no documentation of any past CERCLA hazardous substance releases at the Chester, New Jersey Remote Field Sampling Site.

EML leased this property in 1976 and continues under the auspices of an Agreement instituted in 1976 between EML, then known as the Health and Safety Laboratory (HASL),

Table 3-7

List of Inactive Waste Sites Regulations, Requirements, and Guidelines

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
Public Law (PL) 96-510	Comprehensive Environmental Response, Compensation, and Liability Act	EPA
PL 99-499	Superfund Amendments and Reauthorization Act	EPA
DOE 5400.1	General Environmental Protection Program	DOE
DOE 5400.4	CERCLA Requirements	DOE
DOE 5484.1	Environmental Protection, Safety, and Health Protection Information Reporting Requirements	DOE
DOE 5500.2A	Emergency Notification, Reporting and Response Levels	DOE
40 CFR 300	National Oil and Hazardous Substances Contingency Plan (NCP)	EPA
40 CFR 302	Designation, Reportable DOE-Headquarters Quantities, and Notification	EPA
NYCRR*, Title 6, Chapter 597, Section 597.2	Hazardous Substances List	NYSDEC**

* New York Compilation of Rules and Regulations.

** New York State Department of Environmental Conservation.

and Bell Laboratories, now known as BellCore. The appropriateness and sufficiency of this Agreement, as well as the additional responsibilities and liabilities imposed upon EML by this Agreement, are discussed in the Environmental Management portion of this Audit (see Finding EM/CF-2).

Under the New York City Community Right-to-Know Act, facilities that store listed hazardous substances in excess of the Threshold Reporting Quantity (TRQ) must submit annual reports to the appropriate regulatory authority. These reports (termed Tier I and Tier II) include information about the types, quantities, and storage locations of listed hazardous substances. EML stores chemicals above the TRQ, but was unaware of local reporting requirements.

One Inactive Waste Site best management practice finding has been identified as part of this Audit. EML has not submitted the Tier II hazardous substance storage forms required by the provisions of the New York City Community Right-to-Know Act.

3.7.2 Findings

IWS/BMPF-1: Community Right-to-Know Hazardous Substance Reporting

Performance Objective: The New York City Community Right-to-Know Law, promulgated under the Guidance in Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986, requires facilities which store any listed hazardous substance in excess of the Threshold Reporting Quantity (TRQ), to submit a Tier II Facility Inventory Form. The facility must submit the form by March 1, for the preceding calendar year, for each substance addressed by the regulation. This New York requirement may not be legally applicable, but, at a minimum, constitutes a best management practice.

Finding: The Environmental Measurements Laboratory (EML) has not submitted the New York City Tier II Facility Inventory Form for any previous year, up to, and including 1990.

Discussion: The SARA Title III establishes that communities, including states and other municipal entities, have a right to know the types and amount of potentially hazardous chemicals stored within the local boundary. The SARA Title III guidelines, as developed under 40 CFR 370, set forth a list of hazardous substances and the threshold storage quantities for each, which trigger reporting requirements. The annual reports must be submitted to the state or local emergency planning agency in a format equivalent to the Tier II form given in 40 CFR 370. A state or local agency can establish reporting requirements which are more restrictive than the Federal guidance.

Under the Federal guidelines, in 40 CFR 370.2, research laboratories are exempted from reporting of hazardous substances; however, the New York City Right-to-Know Law, Sections 24-706 and 24-711 (revised April 1991) do not exempt research laboratories from the reporting requirement. In addition, the TRQs of the New York City law are lower than the threshold reporting amounts given under Federal law. At EML, there are at least two substances, nitric acid and hydrochloric acid, which are covered by the New York City standards. At the time of the Audit, these substances were stored in the EML chemical storeroom in the following approximate amounts: nitric acid, 500-1000 pounds and hydrochloric acid, 1000-1200 pounds. The TRQ for these substances are 10 pounds and 100 pounds, respectively.

EML has not prepared or submitted Tier II reports to New York City (I-IWS-3). It is a good management practice for EML to report all hazardous substances stored at the laboratory in excess of the TRQ, according to the New York City guidance and Tier II form.

The apparent causal factors for this finding are inadequate policy implementation of city requirements, and insufficient training of the staff to identify all local environmental requirements.

3.8 Environmental Management

3.8.1 Overview

The Environmental Management portion of the Audit evaluated the status and effectiveness of the Environmental Measurements Laboratory's (EML's) management as it related to ensuring regulatory compliance and implementing DOE policies and directives. The Audit entailed an assessment of EML's management of its environmental protection program and the line organization interfaces. Table 3-8 lists the DOE Orders, Secretary of Energy Notices (SENs) and Guidelines that were used in this evaluation.

The Environmental Management appraisal of the Environmental Audit was accomplished through interviews and discussion with personnel at EML, DOE Field Office, Chicago (DOE-CH), and Office of Energy Research (DOE-ER)/Office of Health and Environmental Research (OHER); review of written documents, policies, internal reports, and correspondence; and consultations with all Environmental Audit Team discipline specialists.

The environmental management of EML was assessed on the following points:

- culture and attitude;
- organizational structure, line responsibility, and accountability;
- formality of environmental programs;
- oversight and reporting activities;
- internal and external communication;
- management commitment and support for environmental protection; and
- management guidance, training, and procedures.

The ideals and goals established by Secretary Watkins in his 10-point Initiative, and other characteristics of the "new culture," are key criteria when considering environmental management issues. Specific to Secretary Watkins' 10-point plan, were the following relevant initiatives: "Resetting of priorities to reflect environment, safety and health as more heavily weighted than production;" and "Strengthening the environment, safety, and health technical capabilities of line managers within the DOE organizational structure." There was general consensus within the EML management on the criteria defining the new culture.

EML, as a DOE environmental research laboratory, has an established mission to "conduct environmental research concerning pollutants associated with energy technologies and related national security activities, principally for the purpose of providing the scientific information required to determine the consequent effects on human health and the environment." In carrying out its research mission, EML's inventories and routine uses of reagent radioactive chemicals are inherently minimal. As a result, EML has defined its

Table 3-8

List of Environmental Management Regulations, Requirements, and Guidelines

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
SEN-6D-91	Departmental Organizational and Management Arrangements	DOE
SEN-29-91	Performance Indicators and Trending Program for Department of Energy Operations	DOE
DOE 5400.1	General Environmental Protection Plan	DOE
DOE 5480.1B	Environment, Safety, and Health Program for Department of Energy Operations	DOE
DOE 5480.19	Conduct of Operations Requirements for DOE Facilities	DOE
DOE 5700.6C	Quality Assurance	DOE
--	Secretary Watkin's 10-Point Initiative (6/27/89)	DOE
--	Preliminary Reviews of Trends in Tiger Team Assessments (1/26/90)	DOE
--	Guidance on Environment, Safety, and Health (ES&H) Self-Assessment (7/31/90)	DOE
CH 1100.C	DOE Field Office, Chicago Self-Assessment Program	DOE-CH
CH 5480.1B	Environment, Safety, and Health Appraisal Program for Chicago Operations Office (CH) Operations	DOE-CH

environmental risk as low, and consequently, EML's environmental protection program is minimal.

However, it appears that the environmental protection program management at EML can best be summarized by the concept of "culture lag" (i.e., the delay in adjustments of social systems to changes occurring outside the immediate system). As new cultural elements are brought into the existing system, that system must adapt its beliefs, ideals, institutional/ organizational arrangement, and routines of doing things to fit the new cultural elements. This Audit was conducted 2 1/2 years after Secretary Watkins' new culture was announced. While some progress has been made recently in developing formalized plans and procedures for meeting these goals (such as the *Environmental Protection Implementation Plan* and the draft *Conduct of Operation* document), EML has not totally embraced the new DOE culture. Specifically, EML has not developed and implemented either an Environmental, Safety, and Health (ES&H) Internal Appraisal Program or an ES&H Self-Assessment Program.

Overall, EML has not been proactive in its environmental compliance activities. Its current environmental protection program is informal, and documented plans and procedures to control the conduct of these operations have not been completed. EML's organizational structure is consistent with DOE's expectations in that ES&H program responsibility and oversight report at the Laboratory Director level. These responsibilities are delegated to the Laboratory Safety Officer, Radiation Safety Officer, and the Laboratory Environmental Protection Officer. Currently, the Laboratory Environmental Protection Officer's position is vacant, and the role is being assumed as a collateral duty of the Deputy Director. Line management has accepted responsibility for environmental protection and compliance. EML management has taken some actions during the past year to increase the support for, and the effectiveness of, its environmental protection program, including environmental protection responsibilities for the Laboratory, Division, and Branch Safety Officers. But, in some cases the roles and responsibilities have not been effectively communicated, and consequently, are not well understood by the support staff. Training for environmental protection activities has been limited throughout EML.

DOE-CH performed an environmental protection program appraisal at EML in November 1990, and corrective actions are ongoing. ES&H oversight by DOE-ER has been minimal, but OHER has indicated that the OHER Environmental Protection Specialist will be working with EML on the development of the corrective action plan for this Audit.

The Environmental Management component of the Audit identified three compliance findings and one best management practice finding. The compliance findings address the areas of ES&H internal appraisal and self-assessment programs, formality of environmental protection program, and environmental protection provisions in agreements and contracts. The best management practice finding addresses environmental protection program staffing and training.

3.8.2 Findings

EM/CF-1: Environment, Safety, and Health Internal Appraisal and Self-Assessment Programs

Performance Objective: DOE 5480.1B, *Environmental, Safety, and Health Program for DOE Operations*, establishes that organizations conduct internal appraisals with sufficient scope and frequency to ensure effectiveness of environment, safety, and health (ES&H) activities, and that internal appraisals shall be conducted at the operating level by persons not directly responsible for performance of the activities being appraised. CH 5480.1B supplements the provisions of DOE 5480.1B and establishes the ES&H Program for DOE Field Office, Chicago (DOE-CH) operations.

A DOE memorandum issued by the Secretary of Energy on January 26, 1990, directs that all line management organizations institute a formalized self-assessment program. A second DOE memorandum issued by the Secretary of Energy on July 31, 1990, *Guidance on ES&H Self-Assessment,* provides guidance for the development of programs for self-assessment of ES&H implementation, which states that a comprehensive self-assessment program should cover all facilities, buildings, and activities under the control of the line management entity and includes all applicable areas of ES&H. All ES&H areas should be examined at all levels within the organization. Continual line management self-evaluation should be implemented at all levels of the line organization, however, this does not substitute for independent internal assessment.

Finding: The Environmental Measurements Laboratory (EML) has not developed and implemented formal ES&H Internal Appraisal and Self-Assessment Programs as directed by DOE Orders and Memoranda.

Discussion: EML recently conducted its first internal appraisal of its ES&H program (October 29-31, 1991). But, EML has not developed a formal internal appraisal system which is clearly defined in writing, is auditable, and has reviewed the overall operation of each facility with sufficient frequency to ensure adequate environmental protection coverage.

EML has not developed a comprehensive self-assessment program. In August 1991, the Director of EML appointed a Self-Assessment Committee. EML did not receive the DOE memorandum of January 26, 1990, entitled *Preliminary Review of Trends in Tiger Team Assessments*, or the DOE memorandum of July 31, 1990, entitled *Guidance on ES&H Self-Assessment* from either the Office of Energy Research (DOE-ER) or DOE-CH at the time they were issued. The first memorandum directs all line organizations to implement a comprehensive self-assessment program to identify and characterize ES&H concerns relating to their operations. The self-assessment program guidance memorandum recommends that each organization have a documented program for self-assessment that assigns responsibilities; defines assessment scope and schedule; provides for development of standard operating procedures for conducting assessments; specifies procedures for documenting, communicating, and tracking findings and identifying trends, causal factors, and root causes; and formalizes a system for carrying out corrective actions.

DOE-CH just recently distributed its Self-Assessment Program guidance (D-EM-18 and D-EM-19) to EML. OHER has not transmitted the Energy Research Self-Assessment

Program Plan to EML (I-EM-6). The EML Self-Assessment Committee is currently reviewing this information, in conjunction with the information from the recent internal audit, to aid in developing a self-assessment program. Institutionalized programs in these areas will assist the organization in identifying its own problems, and move it from a reactive mode to a proactive mode, which parallels DOE policy.

The apparent causal factors contributing to this finding are change, lack of policy implementation, lack of training, lack of procedures, and insufficient resources. EML has not allocated sufficient resources, trained personnel, and developed procedures to implement DOE policies.

EM/CF-2: **Formality of Environmental Protection Program**

Performance Objective: DOE 5480.19, *Conduct of Operations Requirements for DOE Facilities*, Chapter 1, Section A, states that effective implementation and control of operating activities is primarily achieved by establishing written standards in operations, periodically monitoring and assessing performance, and holding personnel accountable for their performance. Section B states that a high level of performance is accomplished by establishing operating standards, communicating these standards to the working level, and by providing sufficient resources to the Operations Department.

DOE 5700.6C, *Quality Assurance*, establishes environmental protection quality assurance (QA) requirements to ensure that risks and environmental impacts are minimized, and that safety, reliability, and performance are maximized through the application of effective management systems commensurate with the risks posed by the facility and its work. This Order implements the policy of the Department to ensure that QA requirements are clearly specified for the broad spectrum of work performed by DOE and its contractors.

In establishing the environmental protection program QA criteria, the Order states that documents shall be prepared, reviewed, approved, issued, used, and revised to prescribe processes, specify requirements, or establish design. In addition, records shall be specified, prepared, reviewed, approved, and maintained.

In addition, the QA Order states that work shall be performed to established technical standards and administrative controls. This work shall be performed under controlled conditions using approved instructions, procedures, or other appropriate means, and items used in this work shall be identified and controlled to ensure their proper use.

Finding: The Environmental Measurements Laboratory (EML) does not have a comprehensive environmental protection program that is fully documented in controlled plans and procedures.

Discussion: Many of the elements of EML's *Environmental Protection Program*, including hazardous and radioactive waste management (see Findings WM/CF-3 and WM/BMPF-1), discharge of laboratory wastes (see Finding SW/BMPF-3), radiological sampling of airborne effluents (see Finding RAD/BMPF-1), survey and release of potentially contaminated materials and equipment (see Finding RAD/CF-2), and maintenance of radiological emissions as low as reasonable achievable (see Finding RAD/CF-1), are conducted in an informal manner (i.e., documents and procedures are either lacking or deficient).

Many of EML's documents and plans that affect its environmental protection programs, such as the *Environmental Protection Implementation Plan* (EPIP) (D-EM-1), the *Conduct of Operations* (D-EM-26), and the *Safety Manual* (D-EM-13), are not part of a document control system, and management approval of some of these documents is not evident. The *EML Institutional Quality Assurance Plan* is explicit in that it provides guidance for EML's research efforts. But, nonresearch efforts, such as environmental protection activities are not identified as part of the *EML Institutional Quality Assurance Plan*.

EML has not formally assigned the authority to make decisions related to environmental protection stop work authority to the organizational levels that can provide the most timely response to mitigate potentially adverse impacts. However, management has indicated that stop work authority is implicit, since all of the professional staff understands that they have stop work authority in the environmental area.

Documented environmental protection program plans are needed to assure that implementation of environmental protection programs is consistent with DOE requirements. Written procedures provide the assurance that environmental protection program activities, such as waste handling, are conducted correctly and consistently. Written procedures also provide guidelines to instruct personnel. A document control system will help to ensure that current versions of plans, procedures, and other prescriptive documents are being utilized.

The apparent causal factors for this finding are inadequate policy implementation, procedures, and training. EML has not developed and implemented DOE policy in written plans and procedures. It has not adequately trained personnel on site policy and DOE Orders.

EM/CF-3: Environmental Protection Provisions in Agreements and Contracts

Performance Objective: DOE 5480.1B, *Environmental, Safety, and Health Programs for DOE Operations*, and 5400.1, *General Environmental Protection Program*, establish DOE policy on environmental protection. DOE 5480.1B states that it is DOE policy to assure the protection of the environment and the health and safety of the public. It is implicit in the Order that organizations performing DOE work are responsible for assuring that all operations under their jurisdiction are carried out consistently with sound environment, safety, and health (ES&H) practices and in accordance with the ES&H Orders. In carrying out this responsibility, organizations shall assure that environment, safety, health, and quality assurance requirements are included in contracts.

DOE 5400.1 further defines environmental protection requirements: "It is DOE policy to conduct its operations in an environmentally safe and sound manner.... While responsibility for good environmental management is a Department one, environmental protection practices will, of necessity, be carried out at all levels and locations where DOE activities are performed by its management and operating contractors; it is DOE policy that contractors will share the Department's commitment to good environmental management."

The Environmental Measurements Laboratory's (EML's) *Conduct of Operations* document (D-EM-26) states "EML's policy is to conduct such operations in compliance with all local, state, Federal and DOE regulations and requirements relating to occupational and environmental safety, waste disposal and waste minimization."

Finding: EML does not have a formal system to ensure environmental protection for its agreements and contracts.

Discussion: Historically, EML has not addressed environmental protection provisions in its contracts. The Agreement between EML (DOE) and the American Federation of Government Employees - local 2828, American Federation of Labor and Congress of Industrial Organizations (AFL-CIO) (D-EM-33), in effect since October 28, 1983, does not include an article on DOE or Federal laws, and guidelines relating to environmental protection, although it does include an article on health and safety.

The Agreement (D-EM-12) granting EML permission to use a parcel of land located on the Bell Laboratories' property in Chester, New Jersey for an environmental monitoring research station, was approved in 1976 and is currently in place. During this time period, environmental regulations have changed such that without administrative controls on the part of EML, its ability to effectively implement the provisions of the Agreement may be limited. In addition, the principals to the Agreement, the US ERDA and Bell Laboratories are currently the US DOE and Bell Core, respectively. More recently, EML has negotiated with Bell Core to use additional space outside the original location at the Chester Site, but no formal documentation of this Agreement is in place.

The apparent causal factors for this finding are policy implementation, and policy change in that EML has not reviewed contracts or agreements as DOE's policies changed.

EM/BMPF-1: **Environmental Protection Program Staffing and Training**

Performance Objective: Good management practice requires that environmental protection program staff have adequate resources and relevant training to implement environmental protection programs.

Finding: The Environment Measurements Laboratory (EML) has not developed a systematic approach to identify relevant resources and training to ensure staff are aware of environmental protection responsibilities and liabilities, and are available to provide timely support to EML's environmental protection programs.

Discussion: EML has had an acting Laboratory Environmental Protection Officer since May 1991, when the designated Environmental Protection Officer resigned. EML is currently reprogramming to fill this position, but if the position cannot be filled internally, EML will initiate an external search. Until this position is permanently filled, it may be difficult to provide support to EML's environmental protection program activities in a timely, responsive manner, because of the collateral duties of the acting Environmental Protection Officer.

To support environment, safety, and health (ES&H) efforts, EML management indicated (I-EM-1, I-EM-2, I-EM-4, and I-EM-5) that the Division and Branch Safety Officers are responsible for carrying out periodic (generally monthly) safety inspections, identifying infractions, training staff, and suggesting corrective actions. Some aspects of these inspections overlap to environmental issues (e.g., spill kits). Safety training is provided by the Laboratory Safety Officer (I-EM-11) to assist these officers in performing their duties. But, interviews (I-EM-7 and I-EM-12) with these personnel indicated that little formal training has been provided to aid them in performing inspections relating to environmental issues. In addition, the safety officers' roles and responsibilities regarding environmental protection are not well understood by the individuals in these positions (I-EM-7 and I-EM-12).

The EML staff includes a solid core of experienced and capable professionals, however, the current situation with respect to resources and training has revealed a need for additional considerations to address the issues identified as part of this Audit (see Findings WM/CF-3, WM/BMPF-1, SW/BMPF-3, and TCM/CF-1). Specifically, there is a lack of definition of the interface between the Division and Branch Safety Officers, the Laboratory Safety Officer, and the Laboratory Environmental Protection Officer regarding responsibilities and support obligations. Resources can improve the responsiveness in implementation of environmental protection requirements, and regulations and training can improve the job knowledge and effectiveness of these personnel.

The apparent causal factors for this finding are inadequate training, institutional change, and lack of resources.

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APPENDIX A

BIOGRAPHICAL SKETCHES
OF THE
ENVIRONMENTAL AUDIT TEAM

APPENDIX A:

BIOGRAPHICAL SKETCHES OF THE ENVIRONMENTAL AUDIT TEAM

NAME:	Paul Lin
AREA OF RESP:	Audit Team Leader
ASSOCIATION:	U.S. Department of Energy
EXPERIENCE:	26 years

- U.S. Department of Energy, Office of Environmental Audit
  - Environmental Engineer. As a Team Leader of multidisciplinary professional teams, conduct Environmental Assessments and Audits at DOE facilities.
- U.S. Army Engineering and Housing Support Center
  - Environmental Engineer. As center of expertise on Army's Sanitary and Environmental Engineering programs for water, wastewater, and solid and hazardous waste, provided staff support to the Army Secretariat and the field.
- U.S. Army Materiel Command
  - Environmental Engineer. Provided Army Environmental Program policy guidance and support to Command installations. Had primary responsibility for the entire Army Installation Restoration program (Army Superfund).
- U.S. Army Logistics Management Center
  - Environmental Protection Specialist. As Chairman of the Environmental Management Committee, had full responsibility for Army environmental management courses and training.
- U.S. Army Corps of Engineers Missile Construction Office
  - Environmental Engineer. Responsible for the environmental engineering aspects of the missile construction program.
- U.S. Army Corps of Engineers
  - Environmental Engineer. Formulated and evaluated water pollution factors from the Corps' operations to the impact of surface and groundwater characteristics.

BIOGRAPHICAL SKETCHES OF THE ENVIRONMENTAL AUDIT TEAM

- Virginia State Water Control Board
    - Water Resources Planning Engineer. Conducted and had primary responsibility for water pollution control and management and water resources planning. Initiated and developed State of Virginia's National Pollution Discharge Elimination System (NPDES) program.

EDUCATION:
U.S. Army Staff Management College, Fort Belvoir, VA
M.S., Environmental Engineering, SUNY Stony Brook, NY
B.S., Chemical Engineering, Tunghai University, Taiwan

OTHER:
Diplomate, American Academy of Environmental Engineers. Registered Professional Engineer in the States of California, West Virginia, and Virginia.

BIOGRAPHICAL SKETCHES OF THE ENVIRONMENTAL AUDIT TEAM

NAME: Christine Beling

AREA OF RESP: Assistant Audit Team Leader

ASSOCIATION: U.S. Department of Energy

EXPERIENCE: 7 years

- U.S. Department of Energy, Office of Environmental Audit
  - Environmental Engineer under the direction of the Audit Team Leader/ Environmental Subteam Leader, provides guidance, direction, and assistance to a multidisciplinary group of professionals performing Environmental Audits and Tiger Team Assessments at DOE facilities. Assistant Environmental Audit Team Leader for the Southwestern Power Authority Audit, Rifle, Gunnison and Grand Junction UMTRA Project Sites Audit, Pittsburgh Energy Technology Center Tiger Team Assessment, and the Stanford Linear Accelerator Center Tiger Team Assessment.
- Environmental Strategies Corporation
  - Environmental Engineer responsible for project management at an ongoing Superfund remedial investigation/feasibility study (RI/FS), remedial design/remedial action (RD/RA), and New Jersey Environmental Cleanup Responsibility Act (ECRA) hazardous waste sites. Additionally, responsible for construction management, auditing, and environmental sampling at various sites.
- U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response
  - Environmental Engineer responsible for guidance development for RD/RA activities conducted at Superfund sites by potentially responsible parties. Instructor for the corrective action order workshop regarding design and construction activities.
- U.S. Environmental Protection Agency, Region II, Office of Emergency and Remedial Response
  - Environmental Engineer responsible for all phases of RI/FS and RD/RA at various Superfund sites. Special Assistant to the Regional Administrator.

EDUCATION: B.S., Chemical Engineering, Tufts University

BIOGRAPHICAL SKETCHES OF THE ENVIRONMENTAL AUDIT TEAM

NAME: Susan Barisas

AREA OF RESP: Technical Coordinator

ASSOCIATION: Argonne National Laboratory

EXPERIENCE: 15 years

- Argonne National Laboratory

  - Participant in the Tiger Team Assessments of Savannah River Site and Lawrence Berkeley Laboratory and Environmental Audits at the Southwestern Area Power Administration, Uranium Tailings Remedial Action Project, and the Component Development and Integration Facility sites. Provided technical assistance to the DOE in the development and execution of environmental survey and audit programs. Principal responsibilities include conducting environmental surveys at eight major DOE operating facilities, evaluating audit and appraisal procedures used by the DOE and private industry, and developing guidance manuals to be used by DOE facilities and field organizations.

  - Worked on various projects related to hazardous waste materials management. Responsibilities included developing hazardous waste and materials management plans, evaluating applicability of treatment and disposal options for synthetic fuels facilities, evaluating technologies for the treatment and disposal of PCB waste, and assessing the environmental impacts of alternative energy scenarios.

- Iowa Natural Resources Council

  - Developed task force reports on Water for Energy Production, Water for Commercial and Recreational Navigation, and Water quality for a State Comprehensive Water Plan. Aided in the development of a public participation program.

EDUCATION: M.S., Water Resources/Agricultural Engineering, Iowa State University
B.A., Biology, Grinnell College

BIOGRAPHICAL SKETCHES OF THE ENVIRONMENTAL AUDIT TEAM

NAME: Dean A. Bass

AREA OF RESP: Quality Assurance

ASSOCIATION: Argonne National Laboratory

EXPERIENCE: 5 years

- Argonne National Laboratory
  - Participant in the Environmental Audit at the Component Development and Integration Facility. Involved in the Waste Isolation Pilot Plant (WIPP) Project, developing sections of the Quality Assurance Program Plan for the WIPP Experimental-Waste Characterization Program, and preparing methods for inclusion in the Waste Characterization Program Sampling and Analysis Guidance Manual. Has most recently been involved in providing support for the Interlaboratory Performance Evaluation Program through the Laboratory Management Branch.
- Hitachi Instruments
  - Application Scientist. Provided technical support in Atomic Spectroscopy. Developed and evaluated new applications and techniques; prepared and conducted instrument demonstrations, sales, and customer training; and recommended marketing strategies.

EDUCATION: Ph.D., Analytical Chemistry, University of Texas at Austin
M.A., Analytical Chemistry, University of Texas at Austin
B.A., Chemistry/Chemistry-Marketing, University of Northern Iowa

BIOGRAPHICAL SKETCHES OF THE ENVIRONMENTAL AUDIT TEAM

NAME: Lynne Day

AREA OF RESP: Administrative Support

ASSOCIATION: META

EXPERIENCE: 15 years

- META, Inc.
  - Information Management Specialist. Provides administrative support for Environmental Audits and the Environmental Subteam on DOE Tiger Team Assessments. Participant in the Tiger Team Assessments of the Solar Energy and Research Institute and Los Alamos National Laboratories, and Environmental Audits of the Uranium Tailings Remedial Action Project and the Component Development and Integration Facility sites. Provided support for the Environment, Safety and Health Progress Assessment at the Fernald Environmental Management Project.
- INNOVA Communications, Inc.
  - Office Administrator. Provided system and documentation support for a local and wide area network integration firm. Worked on office automation systems configuration analysis project providing technical writing and project management support. Responsible for development of instruction materials, graphics support, manuals and vendor documentation. Prepared proposals, presentations, graphics, and technical drawings. Compiled and prepared statistical data for price quotations, cost proposals, and for use in analysis and reporting.
- Sandler & Greenblum
  - Word Processing Departmental Manager. Developed and coordinated activities related to the word processing department for law firm specializing in patent/trademark law. Responsible for direct supervision and staffing of word processing department. Responsible for hardware and software procurement and installations. Identified and resolved problems, and repaired and replaced malfunctioning hardware components. Performed database management functions.

EDUCATION: A.A., Computer Science, Strayer College, Arlington, VA
Data Processing Diploma, Strayer College, Arlington, VA

BIOGRAPHICAL SKETCHES OF THE ENVIRONMENTAL AUDIT TEAM

NAME: David A. Dolak

AREA OF RESP: Surface Water/Drinking Water/Toxic and Chemical Materials

ASSOCIATION: Argonne National Laboratory

EXPERIENCE: 10 years

- Argonne National Laboratory
  - Environmental Consultant. Technical analyst and author of the New Production Reactor (NPR) Environmental Impact Statement (EIS). Assess the impacts that NPR generated hazardous and radioactive waste would have on waste management facilities at the Hanford Site, Idaho National Engineering Laboratory, and the Savannah River Site. Participated in the Tiger Team Assessment of Lawrence Berkeley Laboratory and environmental audits at the Southwestern Area Power Administration, Uranium Mill Tailings Remedial Action Project, and the Component Development and Integration Facility sites.
- Versar, Inc.
  - Prepared remedial investigation/feasibility studies for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA) sites, and prepared environmental permits to comply with the Clean Water Act, Clean Air Act, and RCRA regulations.
  - Performed environmental insurance audits at industrial facilities to assess the sites' potential for financial liability due to chemical contamination, CERCLA responsibility, noncompliance with RCRA, or violation of Superfund Amendments and Reauthorization Act (SARA) Title III reporting requirements. Assisted various clients in preparing documents for hazardous materials reporting under SARA Section 311, 312, and 313, including data base development for Form R submissions.
  - Lead investigator in the allocation of liability costs to 30 individual parties responsible for toxic contamination at a Superfund site. Project Manager for the assessment and removal of hazardous materials at a large abandoned industrial site near Cleveland, Ohio.
- United States Steel Corporation
  - Analytical Chemist. Diverse background in wet chemical methods and instrument analysis of environmental media.

EDUCATION: M.S., Environmental Science, Water Chemistry, Indiana University
B.S., Environmental Science, St. Joseph's College

BIOGRAPHICAL SKETCHES OF THE ENVIRONMENTAL AUDIT TEAM

NAME: Ron Kolpa

AREA OF RESP: Inactive Waste Sites and Releases/Waste Management/Air

ASSOCIATION: Argonne National Laboratory

EXPERIENCE: 17 years

- Argonne National Laboratory
  - Staff Scientist, Environmental Research Division. Principal responsibilities include CERCLA preliminary assessments and site investigations for the DOE, Department of Defense, Department of Commerce, and Army National Guard properties. Has also served as the project manager for property assessments required on Army properties as a result of the Base Closure and Realignment Act, and as Team Leader for site characterizations of Army National Guard properties throughout the United States. Participated in the Tiger Team Assessment of Lawrence Berkeley Laboratory and environmental audits of the Southwestern Area Power Administration, Uranium Mill Tailings Remedial Action Project, and the Component Development and Integration Facility sites. In addition, Mr. Kolpa chairs the Environmental Research Division's Environment, Safety, and Health Committee and serves as the Environmental Compliance Representative for the Environmental Research Division to Argonne National Laboratory.
- Iowa Department of Natural Resources
  - Prior environmental experience includes over 14 years as technical program specialist and Environmental Program Supervisor for regulatory programs in air, solid waste, and hazardous waste for the State of Iowa. Included during this period was a 2-year detail to the U. S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC, where his responsibilities included the development of Federal and state implementation strategies for hazardous waste programs developed under CERCLA and RCRA authorities.

EDUCATION: M.S., Inorganic Chemistry, Iowa State University
B.S., Chemistry, St. Procopius College

BIOGRAPHICAL SKETCHES OF THE ENVIRONMENTAL AUDIT TEAM

NAME: Peter C. Lindahl

AREA OF RESP: Environmental Management

ASSOCIATION: Argonne National Laboratory

EXPERIENCE: 18 years

- Argonne National Laboratory
  - Group Leader. Principal responsibilities include supervision of environmental analysis group. Served as analytical laboratory project manager for the DOE Environmental Survey Program and currently serving as task manager for gas analysis for the DOE Waste Isolation Pilot Plant Pretest Waste Characterization Program. Also, participated in the DOE Tiger Team Assessments of Savannah River Site and Lawrence Berkeley Laboratory, and environmental audits of the Southwestern Area Power Administration, Uranium Mill Tailings Remedial Action Project, and the Component Development and Integration Facility sites.
- Exxon Production Research Company
  - Senior Research Specialist. Responsible for supervision of inorganic analytical chemistry laboratory in support of coal, oil shale, and hydrothermal research projects and work in a research analytical chemistry laboratory to develop analysis methods for determining trace elements in coal.
- Perkin-Elmer Corporation
  - Senior Product Specialist. Responsible for atomic absorption spectrophotometry and analytical technical support.

EDUCATION: Ph.D., Analytical Chemistry, Southern Illinois University
M.A., Inorganic Chemistry, Southern Illinois University
B.A., Chemistry, Lake Forest College

BIOGRAPHICAL SKETCHES OF THE ENVIRONMENTAL AUDIT TEAM

NAME: William J. Munyon

AREA OF RESP: Radiation/Air

ASSOCIATION: Argonne National Laboratory

EXPERIENCE: 12 years

- Argonne National Laboratory
  - Health Physicist responsible for development of stack effluent monitoring systems at the Laboratory, measurement of tritium in the workplace, measurement of indoor radon, aerosol particle sizing, safety assessments associated with various radiation-producing equipment, and participation in radiological surveys at various DOE facilities undergoing decommissioning.
- Carolina Power & Light/Commonwealth Edison
  - Health Physicist in the nuclear power industry responsible for workplace air sampling program, in vivo monitoring program, assay of radioactive waste, emergency response planning, health physics appraisals, exposure control in the workplace (ALARA), and various applied health physics problems related to external dosimetry.
- National Institutes of Health
  - Measurement and assessment of the beta particle skin dose due to exposure to semi-infinite volumes of Xe-133. Responsible for the technical evaluation involving beta dosimetry as it pertains to estimating the skin dose to workers externally contaminated with radioactive materials.

EDUCATION: M.S., Environmental Sciences/Health Physics, University of Minnesota
B.S., Radiological Health Physics, University of Lowell

OTHER: Certified Health Physicist, American Board of Health Physics

APPENDIX B

ENVIRONMENTAL AUDIT PLAN

APPENDIX B:

PLAN FOR THE DOE ENVIRONMENTAL AUDIT

OF THE

ENVIRONMENTAL MEASUREMENTS LABORATORY

NEW YORK, NEW YORK

DECEMBER 1991

1.0 INTRODUCTION

On June 27, 1989, Secretary of Energy Watkins announced a 10-point Initiative to strengthen environmental protection and waste management activities in the Department of Energy (DOE). One of the initiatives involves conducting Environmental Assessments at DOE's operating facilities.

The purpose of the Environmental Audit of the Environmental Measurements Laboratory (EML) is to provide the Secretary with information on the current environmental regulatory compliance status and associated vulnerabilities, root causes for noncompliance, adequacy of environmental management programs, and response actions to address the identified problem areas.

The scope of the EML Environmental Audit is comprehensive, covering most environmental media and applicable Federal, state, and local regulations, requirements, and best management practices. The environmental disciplines to be addressed in this Audit include air, surface water, waste management, toxic and chemical materials, radiation, quality assurance, and inactive waste sites. The Audit also addresses the performance of environmental management functions.

2.0 ENVIRONMENTAL AUDIT IMPLEMENTATION

The Environmental Audit of EML will be conducted by a Team managed by a Team Leader and an Assistant Team Leader from the DOE's Office of Environmental Audit (OEV) and technical specialists from Argonne National Laboratory (ANL). The names and responsibilities are listed below:

Paul Lin	DOE	Team Leader
Chris Beling	DOE	Assistant Team Leader
Susan Barisas	ANL	Technical Coordinator
Ron Kolpa	ANL	Inactive Waste Sites and Releases/Waste Management/Air
Dave Dolak	ANL	Surface Water/Toxic and Chemical Materials
Peter Lindahl	ANL	Environmental Management
Dean Bass	ANL	Quality Assurance
William Munyon	ANL	Radiation/Air
Lynne Day	META	Administrative Support
Debra Major	META	Administrative Support

2.1 Pre-Audit Activities

Pre-Audit activities for the EML Environmental Audit included the issuance of an Introduction and Information Request Memorandum, a pre-Audit site visit, and initial review of documentation which was sent to the Environmental Team by EML as a result of the information request memorandum.

A pre-Audit site visit was conducted on November 8, 1991 by the Team Leader, Assistant Team Leader, and the ANL Technical Coordinator. The purpose of the pre-Audit visit was to become familiar with the site, to review information being supplied and request additional information, and to coordinate plans for the upcoming Audit with DOE and contractor personnel.

This Environmental Audit Plan is based upon the information received by the Environmental Team as of November 8, 1991.

2.2 Onsite Activities and Reports

The onsite activities for the Environmental Audit will take place from December 2 through December 13, 1991. Onsite activities will include field inspections, file/record reviews, and interviews with site personnel and regulatory personnel. The preliminary schedule for the Audit is shown in the attached agenda. The agenda will be modified as needed during the early part of the onsite Environmental Audit. Any and all modifications to the agenda will be coordinated with the principle contacts from EML.

A daily debriefing with site/facility personnel will be held each afternoon, at which time team specialists will describe their activities and identify issues that may develop into findings.

A closeout briefing is tentative and will be finalized during the Audit. A draft report containing the findings will be provided to the Department of Energy Field Office, Chicago (DOE-CH), Energy Research (ER), and EML for their review and comment.

3.0 AIR

3.1 Issue Identification

The Air related portion of the Environmental Audit will involve an assessment of facility-wide air emissions and emissions control. Areas of particular interest are the emissions of radionuclides, organic vapors, and air toxics. Compliance with the local air authority's regulations, State of New York regulations, National Emission Standards for Hazardous Air Pollutants (NESHAP) requirements, and DOE Order requirements will also be assessed.

The general approach to the compliance assessment will involve a review of existing air quality regulations, operating procedures, and other relevant documents to identify sources of air emissions. Following the document review, a physical inspection of operations, emissions control, and monitoring equipment, if applicable, will be accomplished. The primary emphasis will be an assessment of these procedures to characterize the environmental impact of facility operation and the defensibility of the collected data.

3.2 Records Required

Documents and files to be reviewed during the Audit include, but will not be limited to, the following:

- Source and source emission inventories;
- Environmental monitoring reports;
- Air monitoring program documentation;
- Reports on accidental releases of airborne substances;
- Description/documentation on existing and proposed add-on emission controls and ventilation system drawings; and
- Air related correspondence with regulatory agencies.

4.0 SURFACE WATER

4.1 Issue Identification

The focus of the Surface Water/Drinking Water portion of the Environmental Audit will be on the release of contaminated or polluted wastewaters to the sanitary sewers and the quality of drinking water. Conformance with applicable Federal, state, and local regulations, and DOE Orders will be assessed. The Audit will review the potential for contamination of wastewaters by metals and organics, and review the present conditions of liquid waste disposal, wastewater control, collection, and treatment. The Audit will review current discharge permits or agreements. Any monthly/quarterly operation and monitoring reports for water discharge will be reviewed to assess compliance with requirements. The Audit will also review drinking water distribution systems at EML to determine compliance with DOE Orders for delivery of safe drinking water to employees and/or the public.

The Audit will include identification of discharges to the sanitary sewer system, which may not be addressed in operating permits or other documents. Copies of standard operating procedures (SOPs), operating logbooks, and maintenance records will be reviewed with respect to applicable water and wastewater discharge monitoring and treatment systems, and to determine how closely SOPs are being followed. Interviews with managers and operators of processes, monitoring equipment, and treatment systems will be conducted in order to determine compliance with written procedures.

A walkthrough of the EML site will be made to observe normal laboratory containment practices and the activities for the treatment and disposal of wastewaters. Applicable discharge and monitoring points will be reviewed.

4.2 Records Required

Specific documents and files to be reviewed as part of the assessment include, but will not be limited to, the following:

- Recent analytical data on the quality of wastewater releases;
- Notices of Violations relating to wastewater discharges;
- SOPs for waste and wastewater discharge;
- Detailed drawings of sanitary sewer system;
- Records of drinking water quality;
- Maintenance and inspection records for the drinking water system, including water tanks and cross connection/backflow prevention procedures;
- Internal memos or correspondence relating to surface water/drinking water problems (e.g., backflow prevention measure);

- Any relevant correspondence between EML and the local sanitary district regarding discharge criteria; and
- Other records as determined onsite.

5.0 WASTE MANAGEMENT

5.1 Issue Identification

The Waste Management portion of the Environmental Audit will address the generation and management of solid and hazardous wastes, including accumulation, labeling, characterization, transportation, and disposal, with regards to DOE Orders, state and Federal regulations, and good management practices.

Management of all waste streams will be reviewed. Specific issues that will be investigated include, but are not limited to:

- Status of waste generated and characterization of wastes disposed with respect to the Land Disposal Restriction, and Toxicity Characteristic Leaching Procedure Requirements;
- Status of onsite hazardous waste generation points (e.g., location, waste type, quantities);
- Manifesting and tracking of wastes;
- Satellite accumulation areas;
- Solid waste accumulation, collection, treatment, and disposal;
- Waste minimization plans for solid and hazardous wastes;
- Resource recovery activities; and
- Training of hazardous waste generators and hazardous waste handlers.

5.2 Records Required

Specific documents and files to be reviewed as part of the Audit include, but will not be limited to, the following:

- Written policies and procedures relating to waste management activities including waste management plans, waste minimization plans, internal procedures, and other guidance documents;
- Waste generation and characterization documentation;
- Waste storage, treatment, and disposal records;
- Regulatory permits, permit applications, exclusions, or waivers related to waste management activities;
- Emergency spill response and cleanup procedures;

- Any inspection reports or notices of violation from the State or Environmental Protection Agency (EPA) with regard to hazardous waste management activities;
- Any internal audits or assessments of EML's solid and hazardous waste management program;
- Environmental training records;
- Last 3 years of manifests;
- Any liability audits that have been conducted for hazardous waste disposal or transportation contractors; and
- Any memoranda of agreement between EML and the General Services Administration (GSA) regarding EML waste management activities in GSA-owned facilities.

6.0 TOXIC AND CHEMICAL MATERIALS

6.1 Issue Identification

The Toxic and Chemical Materials portion of the EML Environmental Audit will address the management and use of raw materials and chemical materials with reference to their handling, storage, and disposal. Emphasis will be given to the substances regulated by the Toxic Substances Control Act (TSCA) (for example, polychlorinated biphenyls (PCBs) and Chlorofluorocarbons), and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). An inspection of drum storage and dispensing facilities will be included in the assessment. Information obtained will be evaluated to assess whether the management and control of toxic and hazardous substances are in compliance with Federal, state, and local regulations and pertinent DOE Orders.

Electrical and hydraulic equipment which may contain, or has contained, PCB or PCB-contaminated fluids will be evaluated during the Audit. Records concerning PCBs will be reviewed, including PCB annual reports, records of offsite shipments and disposal, spill reports, and procedures for PCB analysis, removal, and handling.

Toxic and hazardous materials (including oil) purchase and usage records will be reviewed. Areas where these materials are stored and used will be visited, and handling procedures evaluated. Any use of pesticides (herbicides, insecticides, and rodenticide) will be reviewed. If activities are conducted by subcontractors, oversight will be evaluated.

6.2 Records Required

Specific documents and files to be reviewed as part of the Audit include, but will not be limited to, the following:

- Toxic substances labeling and tracking system;
- Procedures for procurement, handling, control, use, and management of toxic substances;
- PCB handling, storage, and disposal procedures and documentation;
- Pesticide purchasing, training, handling, storage, and disposal records;
- Special procedures involving handling, storage, use, and disposal of chlorofluoroalkanes (freons) and chloro-organic solvents;
- Spill control plans for chemical storage and use areas; and
- Audits or inspection reports pertaining to the toxic substances program.

7.0 QUALITY ASSURANCE

7.1 Issue Identification

The Quality Assurance (QA) portion of the Environmental Audit will evaluate current sampling and analysis procedures performed at EML. Laboratories conducting analyses on EML environmental samples, will be audited to ensure that they are generating scientifically valid and defensible data. In addition to QA for environmental monitoring, the QA programs for all environmental functions will be reviewed.

Specific issues that will be addressed include sampling and analysis procedures for environmental samples; laboratory procedures; oversight of laboratories; personnel training; and chain-of-custody procedures. In addition, the QA plan and program for the environmental program will be evaluated including documentation of past audits and assessments performed by EML; followup activities; a determination of the effectiveness of the QA program; and a review of the extent of interaction between EML, the Department of Energy Field Office, Chicago (DOE-CH), and other DOE elements.

7.2 Records Required

Part of the Audit will consist of a review of pertinent documents and files. This will include documents not previously reviewed or received, individual files, and documents which have not been identified at this time. Some specific documents and files to be reviewed, if applicable, include, but will not be limited to, the following:

- QA plans for any supporting analytical laboratories;
- Environmental sampling, analysis, and sample disposal procedures used by contractor(s);
- QA audits by EML of contractor(s) conducting environmental sampling and analysis;
- QA plans, manuals, and implementing procedures for any environmental surveillance programs;
- Summaries of results of QA sample analysis (conducted by EML and/or contractors) of external performance evaluation sample;
- Data validation procedures used for the EML environmental protection program;
- Annual site environmental report; and
- Other records as determined onsite.

8.0 RADIATION

8.1 Issue Identification

The radiological portion of the EML Environmental Assessment will involve the review and observation of sitewide radioactive emissions and effluents, emission and effluent control and monitoring, and the associated impact on the public and the environment. This review and observation will include direct radiation exposure issues, dose assessment methodologies, and quality assurance programs for radiation-related environmental monitoring. The assessment will be performed to determine conformance with radiological standards and requirements in applicable Federal, state, and local regulations and DOE Orders, as well as with best and accepted industry practices.

The assessment will be based on observations of processes, operations, emission control and monitoring, and waste handling. Procedures and/or documentation associated with these activities will be reviewed, and discussions will be held with operational and supervising personnel. Records, reports, and other data associated with continuous, intermittent, and accidental releases, if any, will also be reviewed.

8.2 Records Required

- Inventories of air and wastewater radionuclide release points and quantities;
- Radiation dose evaluations to members of the public as demonstrated by review of the annual environmental report;
- Source inventory files;
- Waste inventory files;
- Characterization of the quantities of radioactive material released to the sanitary sewer system; and
- Review of airborne effluent sampling/monitoring program, including equipment, procedures, and records.

9.0 INACTIVE WASTE SITES

9.1 Issue Identification

The Inactive Waste Site portion of the Environmental Audit will assess the compliance status of the facilities relative to the identification of past disposal sites, and the identification and location of spills/releases of hazardous materials or wastes to the environment. The compliance evaluation will be made based on requirements specified in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA); the National Contingency Plan (NCP); the Natural Resource Trusteeship under CERCLA; the corrective action provisions of the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments (HSWA) of 1984; the Emergency Planning and Community Right-to-Know Act (EPCRA) under Title III of SARA; and various applicable DOE Orders, including DOE Order 5400.4 for CERCLA compliance requirements and Executive Order 12580 (Superfund Implementation). The definition of a release under CERCLA includes any spilling, leaking, discharging, injecting, escaping, leaching, dumping, or dispensing into the environment (including the abandonment or discarding of barrels, containers or other closed receptacles) of any CERCLA hazardous substance.

The general approach to the Inactive Waste Site portion of the Environmental Audit will be to evaluate the procedures for identification of inactive waste sites or past spill/release sites, and how such sites were managed once identified. Of particular concern will be past spills/releases/disposal of chemical materials, including solvents, PCB oils, and petroleum products, in excess of reportable quantities. In addition, there will be efforts to ascertain the quantities of hazardous materials in use and any corresponding requirements for public reporting (i.e., SARA Title III) based on the materials and quantities present. Attention will also be given to a review of the activities of others conducted at the EML field site.

This portion of the Audit will also identify unique or particularly sensitive environmental factors present at any of the EML field sites and identify best management practices for avoidance of adverse impacts to those sensitive environmental areas identified.

9.2 Records Required

Because the main focus of the Inactive Waste Sites portion of the Environmental Audit is on past practices or events, the Audit effort will focus on record review and personnel interviews, supplemented by first-hand observations of known or potential spill/release/disposal sites. The types of records to be reviewed will include, but are not limited to, the following:

- Any permits or compliance agreements addressing past practices;
- Previous environmental audit or inspection reports from outside agencies or internal efforts;
- Preliminary Assessment (PA) and/or Site Inspection (SI) reports if available;

- Historical site maps and aerial photos (including transmission line right of ways);
- Environmental Protection Implementation Plans;
- Notifications or Emergency Planning submittal to local public authorities; and
- Real property and site development planning records associated with environmental assessment.

10.0 ENVIRONMENTAL MANAGEMENT

10.1 Issue Identification

The Environmental Management portion of the Environmental Audit will include an assessment of the overall policies and procedures implemented to ensure conformance with Federal, state, and local statutes and regulations, DOE Orders, and Secretary of Energy Notices. The principal focus will be to assess if there is a sufficient management understanding and oversight of environmental protection programs, and an effective communication of these programs to managers and staff. Management practices will also be reviewed against commonly accepted best industry practices. Quality assurance oversight of the environmental compliance process is a critical element of environmental management and will also be evaluated as part of this Audit.

The general approach to the Audit will include reviews of EML environmental protection program, policies, and procedures documentation and interviews with personnel, from the Department of Energy Field Office, Chicago (DOE-CH), Department of Energy/Energy Research (DOE-ER) office of Health and Environmental Research, and EML, who are responsible for implementation of environmental protection programs. The environmental management portion of the Audit will concentrate on the organizational and procedural arrangements by which all regulations, DOE Orders, Secretarial Notices, and good management practices are implemented. Of particular interest will be determining if formal arrangements are in place to comply with the above, and if these formal arrangements are part of the routine of the operation. Also of interest will be the interagency relationships that determine/oversee or facilitate compliance.

Specific areas of interest will be the effectiveness of management: (1) in meeting the intent of DOE environmental policies; (2) in translating the DOE policies into a useable implementation program; (3) in communicating the environmental protection program to the staff; and (4) in establishing a reasonable oversight program to ensure the staff, DOE consultants, and contractors are satisfying the program objectives.

10.2 Records Required

- Environmental Protection Implementation Plan;
- EML Environmental Policies and internal documents;
- Site Master Plan;
- Environmental compliance audit reports;
- Internal documents relative to Audit findings;
- Long Range Environmental Protection Plan;
- Self-Appraisal Reports, internal appraisals, and corrective action plans;
- Standards for the preparation, review, approval, maintenance, and control of environmental compliance procedures and documents;

- Position descriptions;
- Annual site environmental report;
- Environmental compliance program training; and
- Other records as determined onsite.

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APPENDIX C

ENVIRONMENTAL AUDIT TEAM SCHEDULE OF ONSITE ACTIVITIES

APPENDIX C:

ENVIRONMENTAL AUDIT TEAM SCHEDULE OF ONSITE ACTIVITIES

	Mon. 12/2/91	Tues. 12/3/91	Wed. 12/4/91	Thurs. 12/5/91	Fri. 12/6/91	Sat. 12/7/91
Management AM		• Interview - Deputy Director (Acting) & Laboratory Environmental Protection Officer (Acting) • Interview - Env. Studies Div. Director	• Interview - Rad. Phys. Division Director • Teleconference - ER/OHER Deputy Associate Director & Environmental Protection Specialist • Interview - Radiation Physics Division Safety Officer	• Interview - DOE-CH Environmental Protection Branch Chief • Interview - Lab Safety Officer • Analytical Chemistry Division Safety Officer • Interview - EML Self-Assessment Committee	• Interview - Deputy Director (Acting)	• Report Writing
PM	• Orientation Site Tour	• Interview - Chief Administration Branch Officer • Interview - Analytical Chemistry Division Director	• Interview - Lab. Radiation Safety Officer • Interview - DOE-CH Env. Protection Branch Chief	• Interview - Instrumentation Division Director • Document Review	• Interview - EML Staff	• Report Writing
Quality Assurance AM		• Interview - Deputy Director (Acting)	• Interview - Anal. Chem. Div. Dir. • Interview - Lab Rad. Safety Officer	• Document Review	• Report Writing	• Report Writing
PM	• Orientation Site Tour	• Document Review	• Roof Tour • Document Review			

ENVIRONMENTAL AUDIT TEAM SCHEDULE OF ONSITE ACTIVITIES

		Mon. 12/2/91	Tues. 12/3/91	Wed. 12/4/91	Thurs. 12/5/91	Fri. 12/6/91	Sat. 12/7/91
Inactive Waste Sites/ Waste Management/Air	AM		• Tour Labs (Lab Safety Officer)	• Tour Machine Shop, Materials Storage • Tour Roof	• Tour Chester Field Site • Interview Medical Waste Manager	• Interview Acting Deputy Director • Telephone Interview NY DEC Officials	• Report Writing
	PM	• Orientation Site Tour	• Tour Basement and 1st Floor Storage (Lab Safety Officer)	• Review Waste Mgt. Records, Training Records • Interview - DOE-CH • Interview - EML Waste Coordinator	• Document Review	• Report Writing	• Report Writing
Toxic Materials/ Surface/Drinking Water/Air	AM		• Tour Labs (Lab Safety Officer)	• Tour Machine Shop Materials Storage • Tour Roof	• Interview - Administration/ Chemical Procurement Prevention/ Ventilation • Document Review	• Report Writing	• Report Writing
	PM	• Orientation Site Tour	• Tour Basement and 1st Floor Storage (Lab Safety Officer)	• Interview Deputy Dir. - SARA Title III, Wastewater, Drinking Water, Air • Interview - GSA Bldg. Manager • Review - Bldg. Design/Backflow	• Document Review	• Report Writing	• Report Writing

ENVIRONMENTAL AUDIT TEAM SCHEDULE OF ONSITE ACTIVITIES

		Mon. 12/2/91	Tues. 12/3/91	Wed. 12/4/91	Thurs. 12/5/91	Fri. 12/6/91	Sat. 12/7/91
Radiation	AM		• Lab. Tour with Radiation Safety Officer (RSO) • Air/Liquid Discharges • Rad. Waste	• Review Radiation Source Leak Testing Program; Source Inventory Control Program; Air Effluent Sampling Program with RSO • Roof Tour with General Engineer to Identify Facility exhaust points.	• Followup Interview with RSO Regarding Air Emissions • Document Review	• Record Review • Followup Interviews	• Report Writing
	PM	• Orientation Site Tour	• Review Radioactive Waste Mgt. with RSO • Tour Rad. Waste Storage Facility with RSO	• Interview with Deputy Director and Technical Assistant to discuss NESHAP issues	• Document Review	• Report Writing	• Report Writing

ENVIRONMENTAL AUDIT TEAM SCHEDULE OF ONSITE ACTIVITIES

	Mon. 12/9	Tues. 12/10	Weds. 12/11	Thurs. 12/12	Fri. 12/13
Management	• Report Writing	• Draft Findings to Site	• Factual Accuracy Review • Revisions as Required	• Report to Printing • Preparation for Close-out	• Close-out
Quality Assurance	• Factual Accuracy Review • Revisions as Required			• Report to Printing • Preparation for Close-out	• Close-out
Inactive Waste Sites/Waste Management/Air	• Draft Findings to Site (Inactive Waste Sites, Waste Management)	• Draft Findings to Site (Air) • Factual Accuracy Review	• Factual Accuracy Review • Revisions as Required	• Report to Printing • Preparation for Close-out	• Close-out
Toxic Materials/ Surface Water	• Draft Findings to Site	• Draft Findings to Site • Factual Accuracy Reviews	• Factual Accuracy Review • Revisions as Required	• Report to Printing • Preparation for Close-out	• Close-out
Radiation	• Draft Findings to Site	• Factual Accuracy Review	• Revisions as Required	• Report to Printing • Preparation for Close-out	• Close-out

APPENDIX D

LIST OF SITE DOCUMENTS REVIEWED BY THE ENVIRONMENTAL AUDIT TEAM

APPENDIX D:

LIST OF SITE DOCUMENTS REVIEWED BY THE ENVIRONMENTAL AUDIT TEAM

Doc. No.	Title/Description	Author	Organization	Recipient	Doc. Date
Air (A)					
D-A-1	Environmental Measurements Laboratory Environmental Protection Implementation Plan (EML-EPIP)	Unknown	EML	Unknown	9/91
D-A-2	Clean Air Act Compliance Report (Version 3.0, November 1989)	T. Rockefeller	EML	U.S. EPA, Office of Radiation Programs	10/22/91
D-A-3	Letter re: Ventilation Exhaust System and Attachments	R. Knuth	EML	A. Breslin	3/24/67
D-A-4	Draft New York State Air Guide - 1, Guidelines for the Control of Toxic Ambient Air Contaminants	Unknown	NY State Dept. of Environmental Conservation	Unknown	1991 Edition
D-A-5	Environmental Protection Appraisal Report, Environmental Measurements Laboratory	ES&H, Chicago Operations Office	DOE	Various	11/5-7/90
Surface Water (SW)					
D-SW-1	Mechanical Plumbing and Process Piping Blueprint, 27-9-2, 27-9-3, 27-9-4, 27-9-5	Unknown	Unknown	GSA	4/30/58
D-SW-2	Lead in Drinking Water	D. Bogen	EML	P. Krey	1/30/88
D-SW-3	Lead in Drinking Water	L. Hinchliffe	AFGE Local 2828	G. de Planque	7/27/87
D-SW-4	Lead in Drinking Water	D. Freeswich	GSA	C. Kramer	10/2/87
D-SW-5	Additional Study of Lead in Drinking Water	H. Feely	GSA	P. Krey	10/6/87
D-SW-6	Lead in Drinking Water on the Fifth Floor, Remeasurement	B. Rose H. Feely	GSA	G. de Planque	10/28/87
D-SW-7	Wastewater Discharge Calculations (Collection of Handwritten Information)	Unknown	GSA	Unknown	1991
D-SW-8	Drinking Water Analyses for 4th Floor Northeast Fountain	S. Lerner	Associated Analytical Labs	EML	6/27/91
D-SW-9	Procedures for the Accumulation, Storage and Disposal of Hazardous Waste	Unknown	Unknown	Unknown	Undated

LIST OF SITE DOCUMENTS REVIEWED BY THE ENVIRONMENTAL AUDIT TEAM

Doc. No.	Title/Description	Author	Organization	Recipient	Doc. Date
Surface Water (continued)					
D-SW-10	Environmental Measurements Laboratory Environmental Protection Implementation Plan (EML-EPIP)	Unknown	EML	Unknown	9/91
D-SW-11	Environmental Protection Appraisal Report, Environmental Measurements Laboratory	ES&H, Chicago Operations Office	DOE	Various	11/5-7/90
Waste Management (WM)					
D-WM-1	Environmental Measurements Laboratory Environmental Protection Implementation Plan (EML-EPIP)	Unknown	EML	Unknown	9/91
D-WM-2	Environmental Protection Appraisal Report, Environmental Measurements Laboratory	ES&H, Chicago Operations Office	DOE	Various	11/5-7/90
D-WM-3	RCRA Inspection Letter	P. Krey	EML	L. Grossman, US EPA	8/13/91 11/2/90
D-WM-4	Procedures for the Accumulation, Storage and Disposal of Hazardous Waste	Unknown	Unknown	Unknown	Undated
D-WM-5	Hazardous Waste Manifests	Various	EML	Unknown	Various
D-WM-6	Memorandum re: Implementation of the Medical Waste Tracking Act	T. Traceski	DOE, EH-231	Various	11/21/89
D-WM-7	Letter re: Regulations Associated with Medical Waste Tracking Act of 1988 (MWTA) and Applicability of Requirements to Federal Facilities Involved with the Management of Medical Wastes	J. Watkins	DOE	W. Railly, EPA	10/2/89
D-WM-8	State of New York Department of Environmental Conservation Infectious Waste Manifest	S. Scarpitta	EML	Southland Exchange	3/5/89
D-WM-9	Internal Audit of the EHS Program, October 29-31, 1991 (Draft, Handwritten Notes)	P. Krey	EML	Unknown	11/29/91
D-WM-10	1988 Inventory of Federal Hazardous Waste Activities	D. Freeswick	EML	Unknown	Undated

LIST OF SITE DOCUMENTS REVIEWED BY THE ENVIRONMENTAL AUDIT TEAM

Doc. No.	Title/Description	Author	Organization	Recipient	Doc. Date
Waste Management (continued)					
D-WM-11	Letter re: Radioactive Waste Inventory Awaiting Disposal and Attached EML Radioactivity Inventory	R. Sanna	EML	G. Vazquex, EM	2/28/90
D-WM-12	Procedure for Human Tissue (Bone) Handling and Processing	Unknown	Unknown	Unknown	Undated
D-WM-13	Draft Status of Agreements & Commitments, Environmental Protection Appraisal of The Environmental Measurements Laboratory, November 5-7, 1990	Unknown	Unknown	Unknown	12/4/91
D-WM-14	Letter re: RCRA Inspection and Attached Record of Occurrence	P. Krey	EML	DOE	8/13/91
D-WM-15	Letter re: Summary of EML Safety and Environmental Training Program	A. Crescenzi	EML	M. Flannigan, ESHD	7/29/91
D-WM-16	Record of Environmental Training Courses	Unknown	EML	Unknown	3/89-10/90
D-WM-17	Quarterly EML Report on Environmental Action Items and Attachments	G. de Planque	EML	DOE-CH	5/10/91
Toxic and Chemical Materials (TCM)					
D-TCM-1	Example of Chemical Procurement Requisition	R. Tyson	GSA	R. Tyson	12/4/91
D-TCM-2	Environmental Measurements Laboratory Environmental Protection Implementation Plan (EML-EPIP)	Unknown	EML	Unknown	9/91
D-TCM-3	Chemical Inventory List - Room 518 and 549	T. Beasley J. Calve K. Stevenson	EML	Unknown	2-3/91
D-TCM-4	Chemical Inventory List - Room 514, 516, and 536	S. Scarpitta S. Cheah A. Alicea	EML	Unknown	3/29/91
D-TCM-5	Chemical Inventory List - Room 526	S. Fisenne	EML	Unknown	Undated

LIST OF SITE DOCUMENTS REVIEWED BY THE ENVIRONMENTAL AUDIT TEAM

Doc. No.	Title/Description	Author	Organization	Recipient	Doc. Date
Toxic and Chemical Materials (continued)					
D-TCM-6	Chemical Inventory List - Room 524	A. Kong	EML	Unknown	3/28/91
D-TCM-7	Chemical Inventory List - Room 559	R. Lagomarsino	EML	Unknown	3/18-19/91
D-TCM-8	Chemical Inventory List - Instrumentation Division	E. Grigorovich R. Stuart S. Borenstein	EML	Unknown	2/22/91 3/6/91
D-TCM-9	Chemical Inventory List - 1st and 5th Floors, Administration Branch and Central Storage Room	W. Jackson	EML	Unknown	3/27/91
D-TCM-10	Chemical Inventory List - Environmental Studies Division, Room 555	R. Leifer	EML	Unknown	4/26/91
D-TCM-11	Chemical Inventory List - Room 508 (EMM)	T. Malek	EML	Unknown	2/11/91
D-TCM-12	Chemical Inventory List - Room 552 and 528, EMR, Radiation Physics	A. Crescenzi	EML	Unknown	4/2/91
D-TCM-13	List of Carcinogen Compounds in EMC, Room 519	Unknown	Unknown	Unknown	11/26/90
D-TCM-14	Chemical Inventory List, Chemical Storage Room, Room 541	Various	EML	Unknown	6/5/91
D-TCM-15	1991 Safety Manual (Draft)	Unknown	EML	Unknown	10/91
D-TCM-16	Brookhaven Review of EML	G. Adams	Brookhaven NL	O. White	4/13/89
Quality Assurance (QA)					
D-QA-1	Environmental Measurements Laboratory Environmental Protection Implementation Plan (EML-EPIP)	Unknown	EML	Unknown	9/91
D-QA-2	Environmental Protection Appraisal Report, Environmental Measurements Laboratory	ES&H, Chicago Operations Office	DOE	Various	11/5-7/90
D-QA-3	Procedures for the Accumulation, Storage and Disposal of Hazardous Waste	Unknown	Unknown	Unknown	Undated
D-QA-4	HASL - 300 Procedures Manual	Unknown	Unknown	Unknown	Undated

LIST OF SITE DOCUMENTS REVIEWED BY THE ENVIRONMENTAL AUDIT TEAM

Doc. No.	Title/Description	Author	Organization	Recipient	Doc. Date
Quality Assurance (continued)					
D-QA-5	EML Institutional Quality Assurance Plan	Unknown	EML	Unknown	5/8/91
D-QA-6	EML Safety Manual	Unknown	EML	Various	11/91
Radiation (RAD)					
D-RAD-1	Environmental Measurements Laboratory Environmental Protection Implementation Plan (EML-EPIP)	Unknown	EML	Unknown	9/91
D-RAD-2	Clean Air Act Compliance Report (Version 3.0, November 1989)	T. Rockefeller	EML	U.S. EPA, Office of Radiation Programs	10/22/91
D-RAD-3	Environmental Protection Appraisal Report, Environmental Measurements Laboratory	ES&H, Chicago Operations Office	DOE	Various	11/5-7/90
D-RAD-4	EML Quarterly Radiation Survey: External Radiation Levels	Unknown	EML	W. Lowder, EMR	7/3-5/91
D-RAD-5	Sealed Sources Inventory (of Radionuclides), Tables 1, 2, and 3	Unknown	EML	Unknown	3/22/91
D-RAD-6	Memorandum re: Calculation of the Lower Limit of Detection for the Counting of Air Sampler Filters	R. Sanna	EML	P. Krey, EML	11/27/90
D-RAD-7	Air Sampling Data Sheet	R. Sanna	EML	P. Krey, EML	11/27/90
D-RAD-8	Memorandum re: Semi-Annual Leak Test of Sealed Sources	R. Sanna	EML	W. Lowder, EML	7/5/91
D-RAD-9	EML Semi-Annual Sealed Source Inventory and Leak Testing Sheet	R. Sanna	EML	W. Lowder, EML	7/5/91
D-RAD-10	Radioactive Waste Inventory	Unknown	EML	Unknown	12/3/91
D-RAD-11	EML Nuclear Materials Inventory as of 12/2/91	Unknown	EML	Unknown	12/2/91
D-RAD-12	Reference Standards	Unknown	EML	Unknown	12/2/91
D-RAD-13	Radioactive Sources in Custody of Raymond J. Legomarsino -- EMC	Unknown	EML	Unknown	12/2/91

LIST OF SITE DOCUMENTS REVIEWED BY THE ENVIRONMENTAL AUDIT TEAM

Doc. No.	Title/Description	Author	Organization	Recipient	Doc. Date
Radiation (continued)					
D-RAD-14	Radioactive Sources in Custody of Colin G. Sanderson -- EMC	Unknown	EML	Unknown	12/2/91
D-RAD-15	Radioactive Materials in the Custody of Dr. Salvatore Scarpitta -- EMC	Unknown	EML	Unknown	12/2/91
D-RAD-16	State of New York Department of Environmental Conservation Infectious Waste Manifest	S. Scarpitta	EML	Southland Exchange	3/5/89
D-RAD-17	Monitoring Research (Radioactivity in Surface Air or Deposition on EML's Roof: Local or Regional Origin)	P. Krey	EML	EML File	9/29/91
D-RAD-18	Letter re: EML's compliance with DOE Order 5400.5 "Radiation Protection of the Public and the Environment" and Attached Report	P. Krey	EML	C. Pietri, Science Administrator	11/14/91
D-RAD-19	Letter re: EML's 1990 Calendar Year Report on National Emission Standards for Hazardous Pollutants in Compliance with 40 CFR 61.94, and Attached Report	P. Krey	EML	F. Caporuscio, EPA	6/17/91
D-RAD-20	Letter re: Radionuclide Emissions in regard to NESHAPs and Attached Calculations of the Lower Limit of Detection for the Counting of Air Sampler Filters	G. Vazquez	EML	J. Magruder, EPA	3/6/91
D-RAD-21	Letter re: Radioactive Waste Inventory Awaiting Disposal and Attached EML Radioactivity Inventory	R. Sanna	EML	G. Vazquex, EM	2/28/90
D-RAD-22	DOE Guidance on the Procedures in Applying the ALARA Process for Compliance with DOE 5400.5	Unknown	DOE	Various	3/8/91
Inactive Waste Sites (IWS)					
D-IWS-1	Letter re: Use of Bell Laboratories Property at Chester, New Jersey for Urban Environmental Research Station	D. Looney R. Kendall	Bell Laboratories	J. Harley, Director	6/16/76

LIST OF SITE DOCUMENTS REVIEWED BY THE ENVIRONMENTAL AUDIT TEAM

Doc. No.	Title/Description	Author	Organization	Recipient	Doc. Date
Environmental Management (EM)					
D-EM-1	Environmental Measurements Laboratory Environmental Protection Implementation Plan (EML-EPIP)	Unknown	EML	Unknown	9/91
D-EM-2	EML Institutional Quality Assurance Plan	Unknown	EML	Unknown	5/8/91
D-EM-3	Amendment of Solicitation/Modification of Contract	Unknown	University of Rochester	EML	5/30/90
D-EM-4	Solicitation, Offer and Award	Unknown	EML	Unknown	7/21/88
D-EM-5	Monthly EME Meeting Agenda (Draft)	Unknown	Unknown	Unknown	9/26/91
D-EM-6	Monthly EME Meeting Agenda (Draft)	Unknown	Unknown	Unknown	11/18/91
D-EM-7	Performance Appraisal Plan	Unknown	DOE	Unknown	Undated
D-EM-8	Announcement for New EME Safety Officer Effective 10/1/90	M. Heit	Environmental Studies	D. Freeswick J. Kada R. Larsen	Undated
D-EM-9	Contract Clauses (DOE Set 301) Fixed-Price Supply Contracts	Unknown	DOE	Unknown	7/90
D-EM-10	Recurrent Representations and Certification, Part II (DOE F 4210.5B)	Unknown	DOE	Unknown	10/85
D-EM-11	DOE Order, Environment, Safety, and Health (ES&H) Program for Chicago Operations Office (CH) Operations	Unknown	DOE-CH	Principal Staff, Contractor Mgmt.	Undated
D-EM-12	Letter re: Use of Bell Laboratories Property at Chester, New Jersey for Urban Environmental Research Station	D. Looney R. Kendall	Bell Laboratories	J. Harley, Director	6/16/76
D-EM-13	EML Safety Manual	Unknown	EML	Various	11/91
D-EM-14	Draft Safety Officer Element for Production Administrative Procedure (PAP)	Unknown	EML	Unknown	11/1/91
D-EM-15	Letter re: Transmittal of 1991 EML Safety Manual	A. Crescenzi	EML	Various	9/16/91
D-EM-16	EML Long Range Environmental Plan	Unknown	EML	B. Fritz	10/4/91

List of Site Documents Reviewed by the Environmental Audit Team

Doc. No.	Title/Description	Author	Organization	Recipient	Doc. Date
Environmental Management (continued)					
D-EM-17	EML Property Pass Form	Unknown	EML	Unknown	8/90
D-EM-18	Final Version of DOE Chicago Self-Assessment Program Plan	D. Goldman	DOE-CH	Various, Staff	7/29/91
D-EM-19	Order CH 1100.c, DOE Field Office, Chicago Self-Assessment Program	Unknown	DOE-CH	Various, Staff	7/16/91
D-EM-20	Letter re: Self-Assessment Program Plan	G. de Planque	EML	D. Goldman, DOE-CH	8/30/81
D-EM-21	EML Self-Assessment Program Plan	Unknown	EML	D. Goldman, DOE-CH	8/21/91
D-EM-22	EML Self-Assessment Matrix	Unknown	EML	D. Goldman, DOE-CH	Undated
D-EM-23	Wastewater Discharge Calculations (Collection of Handwritten Information)	Unknown	GSA	Unknown	1991
D-EM-24	Internal Audit of the EHS Program, October 29-31, 1991 (Draft, Handwritten Notes)	P. Krey	EML	Unknown	11/29/91
D-EM-25	Draft Status of Agreements & Commitments, Environmental Protection Appraisal of The Environmental Measurements Laboratory, November 5-7, 1990	Unknown	Unknown	Unknown	12/4/91
D-EM-26	Environmental Measurements Laboratory, Conduct of Operations	Unknown	EML	DOE-CH	Undated
D-EM-27	Letter re: EML's Compliance with DOE 5480.19, per Conduct of Operations Document	P. Krey	EML	DOE-CH	12/14/90
D-EM-28	Letter re: Summary of EML Safety and Environmental Training Program	A. Crescenzi	EML	M. Flannigan, ESHD	7/29/91
D-EM-29	Letter re: IH-90-2 Hazard Communication Training and IH-90-3 Distribution of MSDS	A. Crescenzi	EML	M. Flannigan, ESHD	7/29/91
D-EM-30	Environmental Protection Program, Staffing Levels	Unknown	EML	Unknown	10/31/90

LIST OF SITE DOCUMENTS REVIEWED BY THE ENVIRONMENTAL AUDIT TEAM

Doc. No.	Title/Description	Author	Organization	Recipient	Doc. Date
Environmental Management (continued)					
D-EM-31	Letter re: New Laboratory Safety Rules and Chemical Spill Cleanup Workshop	Donald C. Freeswick	LSO, Office of the Director	K. Clancy, EMA	10/26/90
D-EM-32	Record of Environmental Training Courses	Unknown	EML	Unknown	3/89-10/90
D-EM-33	Agreement between Environmental Measurements Laboratory and American Federation of Government Employees, local 2828 (AFL-CIO)	Unknown	EML	Unknown	Unknown

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APPENDIX E

LIST OF CONTACTS AND INTERVIEWS CONDUCTED BY THE ENVIRONMENTAL AUDIT TEAM

APPENDIX E:

LIST OF CONTACTS AND INTERVIEWS CONDUCTED BY THE ENVIRONMENTAL AUDIT TEAM

Ref. No.	Date	Auditor	Organization	Position	Topic
Air (A)					
I-A-1	12/5/91	R. Kolpa	EML	Deputy Laboratory Director (Acting)	Air Regulation Impact Determinations
I-A-2	12/9/91	R. Kolpa	NYSDEC	Air Specialist Bureau of Application Review and Permitting	Air Permits and Exemptions
I-A-3	12/9/91	R. Kolpa	NYSDEC	Air Specialist Bureau of Application Review and Permitting	Air Permits and Exemptions, Air Toxics and VOC Emission Standards
I-A-4	12/3/91	R. Kolpa	EML	General Engineer	Laboratory Hood Exhausts
I-A-5	12/3/91	R. Kolpa	EPA	NESHAP Inspector Radiologic Diversion	Administration of Federal NESHAP Program
Surface Water/Drinking Water (SW)					
I-SW-1	12/2/91	D. Dolak	EML	Instrumentation Division Director	EML Tour
I-SW-2	12/2/91	D. Dolak	EML	General Engineer	Tour of Laboratories
I-SW-3	12/3/91	D. Dolak	EML	Industrial Hygienist/Lab Safety Officer	Tour of Laboratories
I-SW-4	12/3/91	D. Dolak	EML	Analytical Chemistry Division Director	Tour of Laboratories
I-SW-5	12/3/91	D. Dolak	EML	Instrumentation Division Director	Machine Shop and Storeroom Operations
I-SW-6	12/4/91	D. Dolak	EML	General Engineer	Machine Shop and Storeroom Operations
I-SW-7	12/4/91	D. Dolak	EML	Industrial Hygienist/Lab Safety Officer	Machine Shop and Storeroom Operations
I-SW-8	12/4/91	D. Dolak	EML	Machine Shop Supervisor	Machine Shop use of Water and Wastewater Disposal
I-SW-9	12/4/91	D. Dolak	EML	Storeroom Supervisor	Water Drainage from Storeroom
I-SW-10	12/4/91	D. Dolak	EML	Storeroom Operator	Water Drainage from Storeroom
I-SW-11	12/4/91	D. Dolak	EML	Deputy Laboratory Director (Acting)	Contact with Local Officials Regarding Toxic Material Storage Reporting

LIST OF CONTACTS AND INTERVIEWS CONDUCTED BY THE ENVIRONMENTAL AUDIT TEAM

Ref. No.	Date	Auditor	Organization	Position	Topic
Surface Water/Drinking Water (continued)					
I-SW-12	12/4/91	D. Dolak	GSA	Building Manager	Drinking Water and Sewage Discharge at GSA Building and Backflow Prevention within Building
I-SW-13	12/5/91	D. Dolak	GSA	Building Maintenance Technician	Backflow Prevention within GSA Building
I-SW-14	12/5/91	D. Dolak	NYC Public Health Department	Legal Counsel Assistant	Article 175 of Health Code
I-SW-15	12/5/91	D. Dolak	NYC Department of Environmental Protection	Director of Radiation Control	Discharge of Radioactive Material to Sewer under Article 175
I-SW-16	12/5/91	D. Dolak	NY State Department of Environmental Conservation	Environmental Radiation Specialist	Discharge of Radioactive Material to Sewers
I-SW-17	12/6/91	D. Dolak	NY State Department of Environmental Conservation	Environmental Radiation Specialist	Discharge of Radioactive Material to Sewers
I-SW-18	12/6/91	D. Dolak	EML	General Engineer	Testing of New Drinking Water Fountains
I-SW-19	12/6/91	D. Dolak	EML	Industrial Hygienist, Safety Officer	Testing of New Drinking Water Fountains
Waste Management (WM)					
I-WM-1	12/3/91	R. Kolpa	EML	Laboratory Safety Officer	Waste Management
I-WM-2	12/3/91	R. Kolpa	EML	Chief General Engineer	Laboratory Hood Exhaust Systems
I-WM-3	12/3/91	R. Kolpa	EML	Analytical Chemistry Division Director	Waste Disposal Procedures and Waste Accumulation Areas
I-WM-4	12/9/91	R. Kolpa	NYSDEC	Medical Waste Specialist	Status of State Medical Waste Program
I-WM-5	12/3/91	R. Kolpa	DOE-CH	Chief, Environmental Protection Branch, ES&H Division	DOE-CH Appraisal of 11/90

LIST OF CONTACTS AND INTERVIEWS CONDUCTED BY THE ENVIRONMENTAL AUDIT TEAM

Ref. No.	Date	Auditor	Organization	Position	Topic
Waste Management (continued)					
I-WM-6	12/4/91	R. Kolpa	EML	Laboratory Safety Officer	Hazardous Waste Management Procedures
I-WM-7	12/4/91	R. Kolpa	EML	Director, Instrumentation Division	Waste Management in Machine Shop
I-WM-8	12/4/91	R. Kolpa	EML	Instrument Maker	Management of Machine Shop Waste
I-WM-9	12/4/91	R. Kolpa	EML	Machinist	Management of Machine Shop Waste
I-WM-10	12/4/91	R. Kolpa	EML	Distribution Facilities Supervisor	Hazardous Waste Management
I-WM-11	12/4/91	R. Kolpa	EML	Warehouse Worker	Hazardous Waste Management
I-WM-12	12/5/91	R. Kolpa	EML	Supervisor, Medical Sample Analysis, Analytical Chemistry Division	Procedures for Medical Waste Management and Disposal
I-WM-13	12/9/91	R. Kolpa	EPA Region II	Medical Waste Specialist	Status of Federal Medical Waste Trading Program
Toxic and Chemical Materials (TCM)					
I-TCM-1	12/2/91	D. Dolak	NYC Department of Environmental Protection	------	Community Right-to-Know Act in NYC
I-TCM-2	12/2/91	D. Dolak	EML	Instrumentation Division Director	EML Tour
I-TCM-3	12/3/91	D. Dolak	EML	General Engineer	Tour of Laboratories
I-TCM-4	12/3/91	D. Dolak	EML	Industrial Hygienist, Lab Safety Officer	Tour of Laboratories
I-TCM-5	12/3/91	D. Dolak	EML	Analytical Chemistry Division Director	Tour of Laboratories
I-TCM-6	12/4/91	D. Dolak	EML	Instrumentation Division Director	Machine Shop and Storeroom Operations
I-TCM-7	12/4/91	D. Dolak	EML	General Engineer	Machine Shop and Storeroom Operations
I-TCM-8	12/4/91	D. Dolak	EML	Industrial Hygienist, Laboratory Safety Officer	Machine Shop and Storeroom Operations
I-TCM-9	12/4/91	D. Dolak	EML	Storeroom Supervisor	Storage of Hazardous Chemicals in Storeroom

LIST OF CONTACTS AND INTERVIEWS CONDUCTED BY THE ENVIRONMENTAL AUDIT TEAM

Ref. No.	Date	Auditor	Organization	Position	Topic
Toxic and Chemical Materials (continued)					
I-TCM-10	12/4/91	D. Dolak	EML	Storeroom Operator	Storage of Hazardous Chemicals in Storeroom
I-TCM-11	12/4/91	D. Dolak	EML	Deputy Laboratory Director (Acting)	Replacement of Water Coolers, Contact with Sewer District Regulators
I-TCM-12	12/5/91	D. Dolak	EML	Chief, Administrative Branch	Chemical Procurement
I-TCM-13	12/5/91	D. Dolak	EML	Analytical Chemical Division Director	Chemical Procurement and MSDS
I-TCM-14	12/5/91	D. Dolak	EML	Industrial Hygienist, Safety Officer	EML Response to SARA III
I-TCM-15	12/6/91	C. Beling	EML	Laboratory Safety Officer	Pollution Prevention Awareness Program
I-TCM-16	12/6/91	C. Beling	EH-22	Environment Protection Officer (resigned)	Pollution Prevention Awareness Program
I-TCM-17	12/6/91	C. Beling	EML	Deputy Laboratory Director (Acting)	Pollution Prevention Awareness Program
Quality Assurance (QA)					
I-QA-1	12/3/91	D. Bass	EML	Environmental Protection Officer (Acting)	Quality Assurance (QA) for Environmental Monitoring
I-QA-2	12/4/91	D. Bass	EML	Analytical Chemistry Division Director	QA for Environmental Monitoring; Radiological Waste Handling
I-QA-3	12/4/91	D. Bass	EML	Laboratory Radiation Safety Officer	QA for Radiological Waste Handling
I-QA-4	12/5/91	D. Bass	DOE	Unit Supervisor, Physical Scientist	DOE Order 5820.2A re: 5700.6B or 5700.6C
I-QA-5	12/5/91	D. Bass	ANL	Health Physicist	Clarification on EMC Generation of Transurance and Low-Level Radiation Waste

LIST OF CONTACTS AND INTERVIEWS CONDUCTED BY THE ENVIRONMENTAL AUDIT TEAM

Ref. No.	Date	Auditor	Organization	Position	Topic
Radiation (RAD)					
I-RAD-1	12/3/91	B. Munyon	EML	Laboratory Radiation Safety Officer	Air Emissions, Radioactive Waste, and Liquid Waste
I-RAD-2	12/3/91	B. Munyon	EML	Radiation Safety Officer, Laboratory Safety Officer	Tour of Basement and Waste Storage
I-RAD-3	12/4/91	B. Munyon	EML	Radiation Safety Officer	Source of Leak Testing Program, Nuclear Material Inventory, and Air Sample Program
I-RAD-4	12/4/91	B. Munyon	EML	General Engineer	Tour of Roof and Vent Release Points
I-RAD-5	12/4/91	B. Munyon	EML	Deputy Laboratory Director (Acting), Technical Assistant to Laboratory Director	NESHAP Issues
I-RAD-6	12/6/91	B. Munyon	EML	Radiation Safety Officer	Air Emissions
Inactive Waste Sites (IWS)					
I-IWS-1	12/5/91	R. Kolpa	EML	General Engineer	Historical Perspective on Chester Field Site
I-IWS-2	12/5/91	R. Kolpa	EML	Field Technician	Activities at the Chester Field Site
I-IWS-3	12/6/91	D. Dolak	EML	Industrial Hygienist, Laboratory Safety Officer	SARA Title III reporting
Environmental Management (EM)					
I-EM-1	12/3/91	P. Lindahl C. Beling	EML	Deputy Laboratory Director (Acting)	Environmental Management
I-EM-2	12/3/91	P. Lindahl C. Beling	EML	Environmental Studies Division Director	Environmental Management
I-EM-3	12/3/91	P. Lindahl C. Beling	EML	Administrative Branch Chief	Environmental Management
I-EM-4	12/3/91	P. Lindahl C. Beling S. Barisas	EML	Analytical Chemistry Division Director	Environmental Management

LIST OF CONTACTS AND INTERVIEWS CONDUCTED BY THE ENVIRONMENTAL AUDIT TEAM

Ref. No.	Date	Auditor	Organization	Position	Topic
Environmental Management (continued)					
I-EM-5	12/4/91	P. Lindahl C. Beling	EML	Radiation Physics Division Director	Environmental Management
I-EM-6	12/4/91	P. Lindahl C. Beling P. Lin	ER-OHER	Deputy Associate Director Environmental Protection Specialist	Environmental Programs and Management
I-EM-7	12/4/91	P. Lindahl C. Beling	EML	Physicist, Division Safety Officer	Division Safety Officer Responsibilities
I-EM-8	12/4/91	P. Lindahl	EML	Physicist, Laboratory Radiation Safety Officer	Laboratory Radiation Safety Officer Responsibilities
I-EM-9	12/4/91	P. Lindahl C. Beling	DOE-CH	Environmental Protection Branch Chief	Environmental Programs and Management
I-EM-10	12/5/91	P. Lindahl C. Beling	DOE-CH	Environmental Protection Branch Chief	Corrective Action Plan Status
I-EM-11	12/5/91	P. Lindahl C. Beling	EML	Industrial Hygienist, Laboratory Safety Officer	Safety Program
I-EM-12	12/5/91	P. Lindahl C. Beling	EML	Division Safety Officer	Division Safety Officer Responsibilities
I-EM-13	12/5/91	P. Lindahl C. Beling	EML	Self-Assessment Program Committee	Self-Assessment Program Status
I-EM-14	12/5/91	P. Lindahl C. Beling	EML	Instrumentation Division Director	Environmental Management
I-EM-15	12/6/91	P. Lindahl C. Beling	EML	Deputy Laboratory Director (Acting)	Environmental Protection Program Staffing

APPENDIX F

DEFINITIONS OF CAUSAL FACTORS AND CONTRIBUTING FACTORS

APPENDIX F:

DEFINITIONS OF CAUSAL FACTORS AND CONTRIBUTING FACTORS

Causal Factor	Definition
Policy	Evaluate if ineffective, outdated, or nonexistent policies contributed to the finding.
Policy Implementation	Ascertain if written policies reflecting Federal, state, and local laws and regulations, codes, and standards were appropriately disseminated, implemented, and updated.
Risk	Evaluate if the site personnel responsible for a situation contributing to a finding have assessed and were aware of the relative degree of risk involved in the action.
Procedures	Identify if written procedures that have been prepared to effectively implement site policy, DOE Orders, and Federal, state, and local laws and regulations were a contributing factor to the finding. Determine if unfamiliarity with, or unavailability of those procedures contributed to the finding.
Personnel	Identify if the educational and work experience backgrounds for personnel holding responsible positions contributed to the finding. Determine if the level of personnel knowledge about the technical and safety aspects of their jobs contributed to the finding.
Resources	Ascertain if the number of personnel or extramural resources available to a job were a contributing factor in the finding. Evaluate if inadequacies in facilities and equipment were a contributing factor to the finding.
Training	Identify if adequate personnel training on implementing site policy, DOE Orders, and applicable Federal, state, and local laws and regulations was a contributing factor to the finding.
Change	Evaluate if changes in site mission, function, operation and established requirements, which rendered existing policies or procedures inadequate or inappropriate, were contributing factors to the finding. Evaluate if the timeliness and effectiveness of changes to site and DOE policy, and the implementing procedures, were a contributing factor to the finding.

DEFINITIONS OF CAUSAL FACTORS AND CONTRIBUTING FACTORS

Causal Factor	Definition
Appraisals, Audits, and Reviews	Determine if ineffective or insufficient appraisals, audits, and reviews or oversight were contributing factors to the findings. The factor should only be used as secondary contributing factor to the finding.
Design	Evaluate if inadequate design of a system was a contributing factor to the finding.
Human Factors	Ascertain if human factors, such as fatigue or deliberate circumvention of a safety system, were contributing factors to the finding.
Barriers and Controls	Determine if inadequacies in established barriers and controls, both administrative and physical, including operational readiness, routine inspections, and preventive maintenance, and/or a lack of these controls, contributed to the finding.
Supervision	Identify if ineffective supervisory controls for implementing policies, procedures, standards, laws, etc., were contributing factors to the finding.
Quality Assurance/Control	Identify if inadequacies in the quality assurance/control program were causal factors in the identified finding. This includes inadequate followup to previously identified findings.

APPENDIX G

LIST OF ACRONYMS AND ABBREVIATIONS

APPENDIX G:

LIST OF ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
A	Air
AEC	Atomic Energy Commission
AFL-CIO	American Federation of Labor and Congress of Industrial Organizations
ALARA	As Low As Reasonable Achievable
ANL	Argonne National Laboratory
BMP	Best Management Practice
BMPF	Best Management Practice Finding
BNL	Brookhaven National Laboratory
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CF	Compliance Finding
DFS	Distribution Facility Supervisor
DOE*	Department of Energy
DOE-CH	Department of Energy Field Office, Chicago
DOE-ER	Department of Energy, Energy Research
DOE-HQ	Department of Energy, Headquarters
ECRA	Environmental Cleanup Responsibility Act
EH	Office of Environment, Safety and Health
EH-24	Office of Environmental Audit
EH-25	Office of NEPA Oversight
EIS	Environmental Impact Statement
EM	Environmental Management
EML	Environmental Measurements Laboratory
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
EPIP	Environmental Protection Implementation Plan
ER	Office of Energy Research
ERDA	Energy Research and Development Administration
ES&H	Environment, Safety, and Health
FAR	Federal Acquisition Regulation
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FTE	Full-Time Equivalent

LIST OF ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
GSA	General Services Administration
HASL	Health and Safety Laboratory
HATCH	High Altitude Test Chamber
HSWA	Hazardous and Solid Waste Amendments
LLW	Low-Level Waste
mCi	Milli-Curies
MSDS	Material Safety Data Sheet
MWTA	Medical Waste Tracking Act of 1988
NCP	National Oil and Hazardous Substances Contingency Plan
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
NPR	New Production Reactor
NYCRR	New York Compilation of Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
OEV	Office of Environmental Audit
OHER	Office of Health and Environmental Research
OSHA	Occupational Safety and Health Administration
PA	Preliminary Assessment
PAP	Production Administrative Procedure
PCB	Polychlorinated Biphenyl
POTW	Publicly Owned Treatment Work
PPAP	Pollution Prevention Awareness Program
ppb	Parts Per Billion
ppm	Parts Per Million
QA	Quality Assurance
RAD	Radiation
RCRA	Resource Conservation and Recovery Act
RD/RA	Remedial Design/Remedial Action
RI/FS	Remedial Investigation/Feasibility Study
RSO	Radiation Safety Officer
SARA	Superfund Amendments and Reauthorization Act
SEN	Secretary of Energy Notice

LIST OF ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
SI	Site Inspection
SOP	Standard Operating Procedure
SW	Surface Water
TCLP	Toxic Characteristic Leaching Procedure
TCM	Toxic and Chemical Material
TRQ	Threshold Reporting Quantity
TSCA	Toxic Substances Control Act
TSDF	Treatment, Storage, or Disposal Facility
WIPP	Waste Isolation Pilot Plan
WM	Waste Management

*Indicates acronym is not defined or spelled out after the first usage in the body of the report.

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